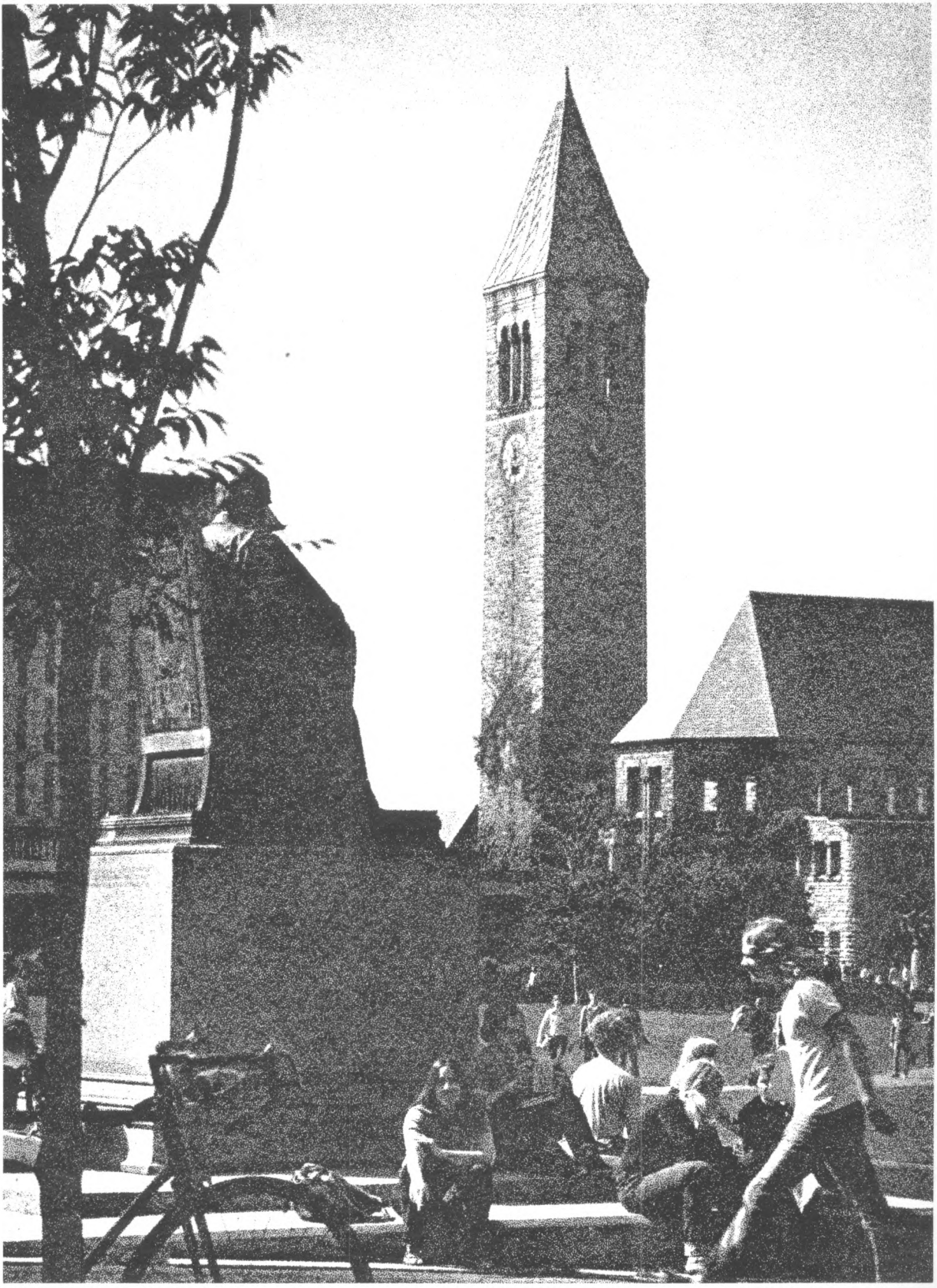

Cornell University

Description of Courses

1979–80

Cornell University Announcements
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Cornell Academic Calendar

	1979–80	1980–81
Registration	Thursday and Friday, August 30 and 31	Thursday and Friday, August 28 and 29
Fall term instruction begins	Monday, September 3	Tuesday, September 2
Fall recess:		
Instruction suspended, 1:10 p.m.	Saturday, October 20	
Instruction resumed	Wednesday, October 24	
Thanksgiving recess:		
Instruction suspended, 1:10 p.m.	Wednesday, November 21	Saturday, November 22
Instruction resumed	Monday, November 26	Monday, December 1
Fall term instruction ends, 5:00 p.m.	Tuesday, December 11	Wednesday, December 10
Final examinations begin	Sunday, December 16	Saturday, December 13
Final examinations end	Sunday, December 23	Monday, December 22
Registration	Thursday and Friday, January 17 and 18	Thursday and Friday, January 29 and 30
Spring term instruction begins	Monday, January 21	Monday, February 2
Spring recess:		
Instruction suspended, 1:10 p.m.	Saturday, March 15	Saturday, April 11
Instruction resumed	Monday, March 24	Monday, April 20
Spring term instruction ends, 1:10 p.m.	Saturday, May 3	Saturday, May 16
Final examinations begin	Monday, May 12	Tuesday, May 19
Final examinations end	Tuesday, May 20	Thursday, May 28
Commencement Day	Monday, May 26	Saturday, May 30

The dates shown in the academic calendar are subject to change at any time by official action of Cornell University.

In enacting this calendar, the University has scheduled classes on religious holidays. It is the intent of the University that students missing classes due to the observance of religious holidays be given ample opportunity to make up work.

Contents

Introduction

Founded in 1865, Cornell University is an independent Ivy League institution and the land-grant university of New York State. There are thirteen colleges and schools, of which four are state supported and nine privately endowed. Eleven of these divisions are located on the Ithaca campus and two — the Medical College and the Graduate School of Medical Sciences — are located in New York City.

This volume describes courses offered by those divisions on the Ithaca campus. Those interested in the divisions located in New York City should write to the appropriate division requesting its *Announcement*. Courses offered during the summer are not always noted in this book. The *Announcement* listing summer courses is distributed on campus each spring and is available by writing Cornell University Announcements, Building 7, Research Park, Ithaca, New York 14850. (The writer should include a zip code.)

Academic Information Information concerning requirements for graduation, grades and academic standing, major or program requirements, advanced placement, financial aid, University procedures, and student services is contained in the *Announcement of Academic Information*, distributed to enrolled students. Students may also consult their advisers or college offices for further information.

The courses and curricula described in this *Announcement*, and the teaching personnel listed herein, are subject to change at any time by official action of Cornell University.

It is the policy of Cornell University actively to support equality of educational and employment opportunity. No person shall be denied admission to any educational program or activity or be denied employment on the basis of any legally prohibited discrimination involving, but not limited to, such factors as race, color, creed, religion, national or ethnic origin, sex, age, or handicap. The University is committed to the maintenance of affirmative action programs which will assure the continuation of such equality of opportunity.

All academic courses of the University are open to students of all races, religions, ethnic origins, ages, sexes, and political persuasions. No requirement, prerequisite, device, rule, or other means shall be used by any employee of the University to encourage, establish, or maintain segregation on the basis of race, religion, ethnic origin, age, sex, or political persuasion in any academic course of the University.

Cornell University is committed to assisting those handicapped students who have special needs. A brochure describing services for the handicapped student may be obtained by writing to the Office of the Dean of Students, Cornell University, 103 Barnes Hall, Ithaca, New York 14853. Other questions or requests for special assistance may also be directed to that office.

Special Opportunity Programs

Cornell University administers a variety of special opportunity programs designed to provide financial assistance and other forms of assistance to (1) minority students and (2) low-income students meeting program guidelines. The emphasis of these special programs is to aid in increasing representation of students from minority groups present in New York State who historically have been underrepresented in higher education. However, participation is also available to those residing outside New York State. For details, prospective students should consult the *Guide for Candidates* which accompanies each undergraduate application or will be sent upon request by the Office of Admissions, 410 Thurston Avenue, Ithaca, New York 14850.

Course Numbering System

The course levels have been assigned as follows:

100-Level Course — introductory course, no prerequisites required, open to all qualified students.
200-Level Course — lower-division course, open to freshmen and sophomores, may require prerequisites.
300-Level Course — upper-division course, open to juniors and seniors, prerequisites required.
400-Level Course — upper-division course, open to seniors and graduates, requires 200- and 300-level course prerequisites or equivalent.
500-Level Course — professional level (e.g., B&PA, Law, Vet.).
600-Level Course — graduate-level course, open to upper-division students.
700-Level Course — graduate-level course.
800-Level Course — master's level, thesis, research.
900-Level Course — doctoral level, thesis, research.

Guide to Course Listings

This list of courses that follows is arranged into two broad groups.

Group 1: Divisions that offer both undergraduate- and graduate-level courses

Agriculture and Life Sciences
Architecture, Art, and Planning
Arts and Sciences
Biological Sciences
Engineering
Hotel Administration
Human Ecology
Industrial and Labor Relations
Nutritional Sciences
Officer Education

Group 2: Graduate professional divisions

Business and Public Administration
Law
Veterinary Medicine

There are no courses offered by the Graduate School as a unit; graduate-level courses are contained in the various departments that offer the instruction.

Within each division courses are generally arranged in alphabetical order by department and in numerical order within the departments. All courses, 0–999, are briefly described for those divisions (group 1) offering instruction to both undergraduate and graduate students. Courses in the graduate professional divisions (group 2) are designated by number and title only.

It is not possible to keep this single volume course list completely up-to-date. The most current information regarding course schedules, sections, rooms, credits, and registration procedures may be found in the *Course and Time Roster* and the *Course and Room Roster*, each issued twice a year by the Office of the University Registrar. Students are also advised to consult the individual college and department offices for up-to-date course information.

New York State College of Agriculture and Life Sciences

Introduction

Programs in agriculture and life sciences offered at Cornell lead to the degrees of Bachelor of Science, Master of Science, and Doctor of Philosophy, as well as several professional degrees, including the Master of Professional Studies, the Doctor of Education, and the Master of Arts in Teaching.

Descriptions of courses, both undergraduate and graduate, are given by department. Information about academic programs, admissions, financial aid, placement, and career opportunities may be found in the *Announcement of Academic Information, Agriculture and Life Sciences at Cornell*, the *Announcement of General Information*, and the *Announcement of the Graduate School* and in the brochures on program areas prepared by the College of Agriculture and Life Sciences.

Graduate study is organized under graduate fields, which generally coincide with the departments. Graduate degree requirements are described in the *Announcement of the Graduate School*. Courses for graduate students are described in the section on the academic department that offers them.

Nondepartmental Courses

ALS 5 Basic Review Mathematics Fall or spring. 3 credits. (The credit is not counted toward the 120 hours required for the degree.) Primarily for entering students.
Fall: M W F 8 (two sections) or 12:20 (two sections). Spring: M W F 12:20. H. A. Geiselmann.
Exposes students to some of the concepts necessary for success in other mathematics and science courses. Basic concepts of algebra, analytic geometry, and trigonometry are covered. Considerable emphasis is placed on the analysis and reasoning involved in the solution of verbal problems requiring the use of mathematics.

ALS 27 Introduction to Farm Techniques Fall or spring. Noncredit. Grade does not appear on transcript. For permission to register, contact the Office of Career Planning and Placement, 16 Roberts Hall.
Fall: T or W 2–5; spring: M T W R or F 2–5. Classes meet at various college farm facilities. W. F. Miller.
Provides supervised instruction in the basic manual skills of farming, including milking by hand and machine, handling livestock, and operating tractors and field equipment. General orientation to the practices and procedures of day-to-day farm operation.

ALS 115 Introductory College Mathematics Fall or spring. 4 credits.
M W F 8 or 12:20; lab, T or R 12:20. H. A. Geiselmann.
Designed to give students with sound high school mathematics backgrounds a unified treatment of the basic concepts of college algebra, analytic geometry, and the elements of calculus. Considerable emphasis is placed on the concept of function, graphing, problem solving, and methods of proof. The Cornell University Computing Language (PL/C) is taught and used to strengthen and integrate the mathematical topics covered.

ALS 401–402 America and World Community (also Government 401–402) 401, fall; 402, spring. 3 credits each term.
M W 7:30 p.m. One World Room, Anabel Taylor. N. E. Awa, R. A. Baer, H. Feldman, J. C. Mbata, R. J. McNeil, K. L. Robinson, and other professors to be announced.
The theme of world community is examined in terms of the directions that the concept suggests, with special reference to the role of the United States in translating the concept to reality. The course seeks to examine the American experience against the background of world community from the point of view of the humanities, the social sciences, the natural sciences, and religious studies.

ALS 416 Agriculture, Society, and the Environment Spring. 3 credits.
Lec, T R 12:20; disc, W evenings and by arrangement. D. Pimentel and others to be announced.
This course, designed and conducted by Cornell students and staff, is aimed at interrelating the many facets of agriculture. The course stresses the importance of a holistic approach to agriculture by offering perspectives on many factors related to food production: soil fertility, plant breeding, pest control, ecosystems, world food problems, livestock production, energy, economics, social and political concerns, labor problems, and land and water management. This approach is used to develop the basic framework on which future options and strategies for food production in the United States and the world are examined and evaluated.

ALS 695 Environmental Biology Fall and spring. 1–3 credits. Prerequisite: permission of instructor.
Hours to be arranged. D. Pimentel.
Focuses on complex energy-environmental problems, using a multidisciplinary approach. Task forces of nine students, each group representing several disciplines, investigate significant energy-environmental problems. Each task force spends two semesters preparing a report for publication, modeled after National Academy of Sciences reports.

Agricultural Economics

O. D. Forker, chairman; D. J. Allee, B. L. Anderson, R. D. Aplin, R. Barker, P. Barkley, S. L. Barraclough, N. L. Bills, D. Blandford, R. N. Boisvert, E. H. Brown, M. E. Brunk, J. B. Bugliari, D. L. Call, G. L. Casler, L. D. Chapman, H. E. Conklin, G. J. Conneman, J. Conrad, L. M. Day, D. U. Fisher, D. K. Freebairn, G. A. German, D. C. Goodrich, Jr., L. L. Hall, R. B. How, R. J. Kalter, W. A. Knoblauch, E. L. LaDue, W. H. Lesser, J. F. Metz, Jr., R. A. Milligan, T. D. Mount, A. M. Novakovic, T. T. Poleman, K. L. Robinson, D. G. Sisler, R. S. Smith, B. F. Stanton, R. P. Story, J. A. Sweeney, L. Tauer, W. G. Tomek, G. B. White

Business Management

Attention is directed to courses in economics and mathematics in the College of Arts and Sciences and in administration in the Schools of Business and Public Administration, Hotel Administration, and Industrial and Labor Relations.

220 Introduction to Business Management Fall. 3 credits.
Lec, M W F 10:10. Disc, M 12:20–2:15 or 2:30–4:25; T 8–9:55, 10:10–12:05, 12:20–2:15, or 2:30–4:25; W 8–9:55, 10:10–12:05, 12:20–2:15, or 2:30–4:25. In weeks when discussions are held, there will be no Wednesday lecture. Discussions will be held instead of a Wednesday lecture in all but three weeks of the term. R. D. Aplin.
The course focuses on principles and tools useful in performing four major functions of management: planning, organizing, directing and leading, and controlling. Within this framework, consideration is given to social, legal, and economic environments; forms of business ownership; financial statements; cost behavior; and a few key concepts and tools in financial management.

221 Accounting Spring. 3 credits. Not open to freshmen.
Lec, M F 10:10; lab, T W or R 9:05–11, 12:20–2:15, or 2:30–4:25. J. Sweeney.
A comprehensive introduction to financial accounting concepts and techniques, intended to provide the student with a basic understanding of the accounting cycle and the elements of financial statement analysis and interpretation. Concepts rather than procedures are emphasized.

320 Business Law Fall. 3 credits. Limited to upperclass students.
Lec, M W F 9:05. One preliminary exam will be given in the evening. J. B. Bugliari.
Consideration is given chiefly to legal problems of particular interest to persons who expect to engage in business. Emphasis is on the fields of personal property, contracts, agency, real property, and partnerships and corporations.

321 Business Law Fall. 4 credits. Limited to upperclass students. Prerequisite: permission of instructor.
Lec, M W F 9:05; disc, M 4, One preliminary exam will be given in the evening. J. B. Bugliari.
The lecture portion is the same as Agricultural Economics 320. Discussions deal with practical applications of the legal principles covered in that course and attempt also to give some deeper insight into the role and function of the lawyer and the judiciary in our society.

322 Taxation in Business and Personal Decision Making Spring. 3 credits. Suggested background: accounting and business law.
Lec, M W 2:30–4. J. B. Bugliari, R. S. Smith.
The impact of taxation, both state and federal, on business and personal decision making. After a brief discussion of tax policy and state and local taxes an in-depth examination is conducted of federal income and estate and gift taxes affecting individuals and business entities. Both tax management and tax reporting are stressed.

323 Managerial Accounting and Economics Fall. 3 credits. Prerequisites: Agricultural Economics 221 and Economics 102 or equivalents.
Lec, M W 1:25; disc, R 10:10–12:05, 12:20–2:15, or 2:30–4:25 or F 10:10–12:05, 12:20–2:15, or 1:25–3:20. Two preliminary exams will be given in the evening. J. Sweeney.
An introduction to cost accounting with emphasis on the application of accounting and economic concepts to managerial control and decision making. Major topics include basic costing, standard costing, cost behavior, cost allocation, pricing, budgeting, linear programming, inventory control, transfer pricing, and measuring divisional performance.

324 Financial Management Spring. 3 credits. Prerequisites: Agricultural Economics 221 and Economics 102 or equivalents.
Lec, M W F 9:05; disc, W 2:30–4:25, R 8–9:55 or 12:20–2:15, or F 9:05–11 or 12:20–2:15. In weeks when discussions are held, there will be no Friday lecture. Discussions will be held instead of Friday lecture in all but two weeks of the term. Two preliminary exams will be given in the evening. B. L. Anderson.
Designed to give knowledge and understanding of business finance. Major topics include capital investment decisions; techniques for handling risk, uncertainty, and inflation in decision making; sources and forms of financing; financial structure; cost of capital; working capital management; and special problems of financial management in the small firm.

420 Advanced Business Law Spring. 3 credits. Limited to upperclass students.
Lec, T R 8:30–9:55. One preliminary exam will be given in the evening. J. B. Bugliari.
Designed to provide a fairly detailed and comprehensive legal background. Selected areas covered in Agricultural Economics 320 are further developed, and particular consideration is given to the law pertaining to bailments, sales, secured transactions, bankruptcy, negotiable instruments, and, if time permits, insurance.

421 Advanced Business Law Spring. 4 credits. Limited to upperclass students. Prerequisite: permission of instructor.
Lec, T R 8:30–9:55; disc, T 4. One preliminary exam will be given in the evening. J. B. Bugliari.
Lectures cover the same material as Agricultural Economics 420. The Tuesday afternoon sessions consist of 14 discussions of aspects of estate planning: estate planning techniques, the law and use of trusts, the law of wills, and federal and New York State estate and gift taxes and probate procedures.

424 Managerial Decision Making Spring. 3 credits. Limited to seniors with advisers in agricultural economics.
T R 10:10–11:40. Instructor to be appointed.
An integrating course that examines business policy formulation and execution from the standpoint of the corporate manager. An advanced course for potential business managers and owners. Includes the concepts and function of strategy, the nature of a company's environment, and the role of leadership in achieving business goals.

425 Personal Financial Management Spring. 2 credits. Primarily for seniors.
Lec, M 12:20–2:15; disc to be arranged. Second hour of lecture will be omitted in weeks when discussions are held. R. S. Smith.
Managing personal income to maximize financial goals and objectives. Discussion sessions are devoted to problems and case studies in financial planning for students and young families. Discussion leaders include representatives of financial institutions, such as banks and insurance companies.

426 Economics of Cooperative Action Fall. 3 credits.
Lec, M W F 12:20. B. L. Anderson.
Investigates the economic role, function, and impact of various forms of group action in agriculture. Institutions considered range from informal interest groups to marketing boards. Attention is given to the theory and operation of cooperative organizations. Topics covered include organization, decision making, structure, methods of financing, legal status, tax treatment, and market performance.

Economics of Agricultural Development

464 Economics of Agricultural Development Spring. 4 credits. Prerequisites: Agricultural Economics 150, Economics 101–102, or permission of instructor.
T R 9:05 and T or W 1:25. D. K. Freebairn.
An examination of the processes of economic development in the developing nations and their interactions with United States policy. Rural development policy receives primary attention with emphasis on developing nations with a dominant agriculture sector and on the key role of agriculture in the overall economic transformation of these economies.

660 Food, Population, and Employment Fall. 5 credits.
M W 2:30–4 and an individual weekly meeting with the instructor. T. T. Poleman.
Examines the links between employment, food, and population growth in less-developed countries. Food economics and the world food situation are treated as cornerstones and examined in historical perspective. Requires a major term paper. To ensure students an opportunity to work individually with instructor, enrollment is limited to 15.

661 Food, Population, and Employment II Spring. 1–3 credits. Prerequisite: permission of instructor.
Individual weekly meeting with the instructor. T. T. Poleman.
Individual guided research for students who want to carry on with projects initiated in Agricultural Economics 660 or to undertake new ones.

664 Microeconomic Issues in Agricultural Development Spring. 3 credits. Prerequisite: Agricultural Economics 608, Economics 311, or permission of instructor.
T R 11–12:30. R. Barker.
Issues such as production efficiency, induced technological change, allocation of research resources, and the distribution of benefits from new technology are discussed. The theoretical argument is related to applied research problems.

665 Seminar on Latin American Agricultural Policy Fall. 3 credits. Prerequisite: Agricultural Economics 464 or permission of instructor.
T 2:30–4:25. D. K. Freebairn.
An examination of policies for the development of the agricultural sector in Latin America, including an identification of policy objectives and a review of the instruments of public policy implementation. Particular attention is paid to the interactions of agrarian structure, agricultural productivity, and rural welfare.

666 Seminar in Agricultural Development Fall or spring. 3 credits. The seminar is normally taught when a visiting professor is available who has had recent direct experience in low-income countries.
Hours to be arranged.
An analysis of current problems for the development of the agricultural sector of low-income countries, with emphasis on the implications of such problems to the definition of research.

668 Seminar in the Economics of Agricultural Development Spring. 1 credit.
Hours to be arranged. Staff.
A joint exploration by staff and graduate students in international development of current research topics. Each student participant is expected to prepare a presentation based on his or her thesis research.

Farm Business Management and Finance

302 Farm Business Management Spring. 4 credits. Not open to freshmen. This course is a prerequisite for Agricultural Economics 402.
Lec, M W 10:10; disc, F 8, 9:05, 10:10, 11:15, or 12:20; lab, T W or R 1:25–4:25. On days farms are visited, the laboratory period is 1:25–5:30. One all-day trip and four half-day trips are taken to visit farm businesses. G. J. Conneman.
An intensive study of problems associated with planning, organizing, operating, and managing a farm business, with emphasis on the tools of managerial analysis and decision making. Topics include management information systems, business analysis, economic principles, and budgeting; and acquisition, organization, and management of capital, labor, land, and machinery.

402 Advanced Farm Business Management Spring. 3 credits. Prerequisite: Agricultural Economics 302 or equivalent.
Lec, M W 9:05; disc, W R 1:25–3:20. G. L. Casler.
Emphasis is on evaluating the profitability of alternative investments and enterprises. Principal topics include the effects of income taxes on investment decisions, capital investment analysis, linear programming, and financial risk and uncertainty. Experience in computer applications to farm business management is provided.

405 Farm Finance Spring. 3 credits. Prerequisite: Agricultural Economics 302.
Lec, T R 10:10; disc, T 1:25–3:20. E. L. LaDue.
A study of financial arrangements for farmers and the credit institutions that serve them. Emphasis is on problems of capital management associated with organizing and operating a commercial farm. Alternative sources of capital are analyzed, with consideration given to safe and profitable debt levels and selection of alternative investment opportunities.

406 Farm and Rural Real Estate Appraisal Fall. 4 credits. Prerequisites: Agricultural Economics 302 or equivalent *and* permission of instructor. Limited to 45 students.
Lec, T R 10:10; lab, R 1:25–4:25. On days farms are visited the laboratory period is 1:25–5:30. One all-day trip. G. J. Conneman.
Focus is on the basic concepts and principles involved in appraisal. A study of factors governing the price of farms and rural real estate and methods of valuation. Practice in appraising farms and other rural properties.

407 Advanced Agricultural Finance Seminar Spring. 2 credits. Limited to 16 seniors with extensive course work in farm management and farm finance. Open by application prior to previous March 1.
T 3:35–5:30. E. L. LaDue.
A special program in agricultural finance conducted with financial support from the Farm Credit System. Includes two days at Farm Credit Banks of Springfield, one week in Farm Credit Association offices, an all-day field trip observing FHA financing during fall term, a four-day trip to financial institutions in New York City during intersession, and lecture-discussions in the spring term. Representatives from banking, agribusiness, finance, and similar areas participate in spring term lecture-discussion sessions.

409 Farm Management Seminar Fall. 1 credit. Limited to seniors and graduate students.
M 1:25–3. B. F. Stanton and staff.
Presentation and interpretation of research in farm management and production economics. Each participant conducts a seminar and prepares a publishable evaluation of research results directed toward farmers and extension and business leaders.

608 Production Economics Fall. 3 credits. Prerequisite: Economics 311 or equivalent. Mathematics 108 or 111 or equivalent suggested.
Lec, M W F 12:20. G. B. White.
A comprehensive survey of the theory of production economics with emphasis on applications to agriculture and agribusiness. Topics include the derivation and uses of production, cost, and supply functions. Some time is spent on the application of production theory to special problem areas.

Food Industry Management and Marketing

240 Marketing Spring. 3 credits.
Lec, M W F 11:15; disc, M 2:30–4:25, T 12:20–2:15 or 2:30–4:25, W 2:30–4:25, R 12:20–2:15 or 2:30–4:25, or F 10:10–12:05. In weeks discussions are held, there will be no Friday lecture. D. C. Goodrich.
An introductory study of the food marketing system and the society it serves, including the goals and practices of farmers and marketers (in such areas as buying and selling, grading, transporting, packaging, and advertising), price-making institutions (such as commodity futures markets), the behavior and purchasing practices of consumers, and the interrelationships among these groups.

340 Economics of Marketing Spring. 3 credits. Prerequisites: Economics 101–102 and Agricultural Economics 240.
Lec, M W F 12:20–1:10. L. L. Hall.
This course provides an integrative framework for analysis of marketing functions, activities, and decisions in the food industry. Producer, consumer, and government behavior in the marketing system are explored, and ther interaction is discussed. The course focuses on the importance of demand, the industrial organization of the food industry, and the causes and consequences of government intervention.

342 Marketing Management Fall. 3 credits. Prerequisites: Agricultural Economics 240 and Economics 101–102.
Lec, M W F 10:10; disc, F 10:10, 11:15, or 12:20. In weeks discussions are held, there will be no Friday lecture. D. C. Goodrich.
Deals with principles and practices in the management of the marketing function. Emphasizes the revenue aspects of marketing by considering sales forecasting and strategies of the firm in product and brand selection, pricing, packaging, promotion, and channel selection. Identification and generation of economic data necessary for marketing decisions are considered.

346 Pricing Milk and Dairy Products Fall. 3 credits.
Lec, M W F 11:15; disc, F 12:20. R. P. Story.
A review of the structural characteristics of the dairy industry and an analysis of the pricing systems for market milk. Particular attention is given to government programs, including marketing orders, price supports, and import policies.

347 Marketing Horticultural Products Fall. 3 credits. Prerequisite: Agricultural Economics 240 or equivalent.
T R 8:30–9:55. All-day field trip the last Saturday in September. R. B. How.
A study of markets, marketing channels, and marketing services for fruits, vegetables, and floricultural commodities. An evaluation of marketing alternatives facing growers, shippers, wholesalers, and retailers of horticultural products. The role of public agencies in market information and regulation. The potential for group action to improve marketing operations.

443 Food Industry Management Spring. 4 credits. Limited to juniors and seniors.
M W F 10:10, W 2–4. G. A. German.
A case-study approach is used to examine the application of management principles and concepts to operating problems of food retailers and wholesalers. Areas included are site selection, buying, merchandising, personnel administration, private label products, and financing expansion programs. Leading food industry specialists frequently join the Wednesday session.

448 Food Merchandising Fall. 3 credits. Limited to juniors and seniors. Prerequisite: Agricultural Economics 240.
Lec, T R 12:20–1:35. G. A. German.
Merchandising principles and practices as they apply to food industry situations. The various elements of merchandising are examined, including buying, pricing, advertising, promotion, display, store layout, profit planning and control, and merchandising strategy.

449 Field Study of Marketing Institutions Fall. 2 credits. Prerequisites: course work in marketing or business management and permission of instructor.
W 3:30–4:30. Two one-day field trips to the upstate area and a three-day trip to the New York City area during intersession just before spring registration. These trips will cost approximately $150.
W. H. Lesser, B. L. Anderson.
This course provides the opportunity for upper-level students to integrate their classwork through a close examination of the marketing institutions, operations, and price determination methods for a cross section of agricultural products.

540 Marketing Research Spring. 2 credits. Prerequisite: permission of instructor.
Lec, R 12:20–2:15. M. E. Brunk.
Objectives of marketing research, organization and management of research and research agencies, problem identification, selecting and planning projects, and design and use of research by management.

741 Agricultural Markets and Prices Fall. 3 credits. Suggested background: Agricultural Economics 710 and 711 and Economics 509 or equivalent.
T R 12:20–2:15. A. M. Novakovic.
Economic theory and analytic methodology are discussed as they apply to the analysis of agricultural marketing and pricing problems and policies. Relevant supply, demand, and trade theories and multiproduct, spatial, and temporal models are studied. Previous agricultural marketing research is criticized.

742 Agricultural Marketing and Public Policy Spring. 3 credits. Limited to graduate students. Suggested background: Agricultural Economics 710 and 711 and an ILR course in industrial organization.
T R 12:20–2:15. W. H. Lesser.
Develops the concepts and methodology for applying and analyzing the effects of public policy directives on the improvement of performance in the United States food marketing system. Topics include a survey of industrial organization principles, antitrust and other legal controls, coordination systems in agriculture, cooperative theory and performance, price information and price discovery methods, and consumer-oriented issues. An application of these techniques to commodity marketing and the analysis of marketing problems in developing economies is also presented.

743 Export Marketing Fall. 3 credits. Limited to graduate students. Estimated cost of field trip, $50.
Lec, R 2:30–4:25. Overnight field trip to New York City required. M. E. Brunk.
The history and development of commercial United States exports of agricultural commodities and the mechanics and procedures of exporting. Alternatives in sales contracts, shipping, insurance, financing, business structure, researching markets, and promotion. Trading experiences of specific commodity specialists.

Public Policy

Attention is directed to courses in the Departments of City and Regional Planning, Consumer Economics and Public Policy, Economics, Government, and Natural Resources, and the Schools of Civil and Environmental Engineering and Business and Public Administration.

150 Economics of Agricultural Geography Fall. 3 credits.
Lec, M W F 11:15 or 12:20. Preliminary exams R 7 p.m., Sept. 27 and Nov. 1. D. G. Sisler.
The economics and geography of world agriculture, providing a basis for understanding past development and future changes. Elementary economic principles, historical development, physical geography, and population growth are studied in their relation to agricultural development and the economic problems of farmers. Where possible, current domestic and foreign agricultural issues are used to illustrate principles.

250 Introduction to Energy Resources Spring. 3 credits.
Lec, M W F 11:15. D. Chapman.
An introduction to the concepts of efficiency, competitive equilibrium, and social cost. The course focuses on basic energy resources, examining production costs and demand for petroleum, natural gas, electricity, nuclear power, and solar energy. The ownership and regulatory structure of each energy industry is discussed, as well as selected policy issues such as price control, taxation, decentralized technologies, and public ownership.

332 Economics of the Public Sector Fall. 3 credits. Prerequisite: Economics 102 or equivalent.
Lec, M W F 11:15; disc, W 2:30–4 or 7:30–9 p.m., R 12:20–1:50, or F 12:20–1:50. D. U. Fisher.
The application of economic concepts to evaluation of the structure and performance of the private and public sectors of the economy. Emphasis on microeconomic analysis of public finance and resource allocation. Principal topics: market failure, income distribution, taxation, evaluation of public expenditures, articulation of public interest, and current public policy issues.

333 Economics of the Public Sector, Advanced Discussion Fall. 1 credit. S-U grades optional. Prerequisite: Agricultural Economics 352 or Economics 311, and concurrent registration in Agricultural Economics 332.
Disc, R 2:30–4:25. D. U. Fisher.
Treats at a more advanced level topics introduced in lecture. Discussions deal with theoretical and practical aspects of public finance.

350 Resource Economics Fall. 3 credits. Prerequisite: either Natural Resources 201 and introductory economics or permission of instructor.
Lec, T R 10:10; disc, T 1:25–3:20 and as arranged. D. J. Allee, H. E. Conklin.
The application of economic and political science concepts to the use of natural resources, with varying attention to water, land, forests, and fisheries. Attention to regional growth, the impact of urban growth, and public decision making in the resources and environmental management area.

351 Farm and Food Policies Fall. 3 credits. S-U grades optional.
Lec, T R 9:05; disc, R 11:15 or 1:25 or F 10:10. K. L. Robinson.
Trade policies and domestic food subsidy programs.

352 Agricultural Prices Spring. 3 credits. Suggested background: Economics 101–102.
M W F 11:15. K. L. Robinson.
An analysis of supply and demand characteristics of farm commodities, institutional aspects of pricing farm and food products, temporal and spatial price relationships, price forecasting, and the economic consequences of pricing decisions.

430 Agricultural Trade Policy Fall. 3 credits. Primarily for seniors and M.S. degree candidates. Prerequisites: Agricultural Economics 351 and either Agricultural Economics 352 or Economics 311.
Lec, T R 11:15; lec or disc, W 12:20. D. Blandford.
An examination of the rationale and method of commodity trade policy. The course analyzes problems and issues in both developed and

less-developed countries and deals with the major questions associated with the organization of international commodity markets.

450 Evaluating Resource Investment and Environmental Quality Spring. 3 credits. Primarily for juniors and seniors. Prerequisite: an introductory course in economics, a 300-level agricultural economics course, or permission of instructor.
T R 10:10–11:30; other disc, as arranged.
D. J. Allee.
Means of reaching decisions on environmental questions. Concepts of social value and cost-benefit analysis, determination of degrees of importance of environmental problems, environmental impact statements, definitions of environmental quality, and questions of political economy.

452 Agricultural Land Policy Spring. 3 credits.
Lec F 8–9:55; disc, F 1:25–4:25; field trips to be arranged. H. E. Conklin.
An examination of changes made in recent decades in the institutional arrangements that control the use of farmland in the northeastern United States; of the manner in which these changes have been made; and of the groups that have pressed for and against these changes. The field trips are designed to familiarize students with local and state agencies, legislatures, and special interest groups.

650 Economic Analysis of Public Policy Spring. 4 credits. Primarily for graduate students but open to seniors. Prerequisite: Economics 311 or 511, calculus, or permission of instructor.
T R 9:05–11. J. M. Conrad.
A review of the theoretical foundations underlying the analysis of public policy. The theory and techniques of cost-benefit analysis, cost effectiveness, and multiple objective programming are covered. Special emphasis is given to public policy aimed at improving environmental quality and the management of renewable and nonrenewable resources. The theory of externalities and dynamic optimization are introduced using economic models of the natural environment and natural resource systems.

[651 Economic Aspects of Energy Use Fall. 4 credits. Offered even-numbered years. Not offered 1979–80.
Lec-seminar, F 1:15–4:15. D. Chapman.
Selected subjects in economic research, including the macroeconomic study of income, employment, and energy use; energy-labor substitutability; decentralized technologies; taxation of utilities and petroleum companies; nuclear economics; competition and monopoly; and public policy.]

652 Special Problems in Land Economics Fall or spring. 1 or more credits. Limited to graduate students. Prerequisite: permission of instructor.
Hours to be arranged. D. J. Allee, H. E. Conklin.
Special work on any subject in the field of land economics.

[730 Seminar on Agricultural Trade Policy Fall. 3 credits. Limited to graduate students. Prerequisites: Agricultural Economics 430 and basic familiarity with quantitative methods. Offered even-numbered years. Not offered 1979–80.
F 1:25–4. D. Blandford, D. G. Sisler.
A discussion of selected topics in agricultural trade policy, such as export promotion versus import substitution in developing countries, and the role of international commodity agreements. The preparation of a term paper is an important part of the course.]

731 Seminar on Methods of Trade and Commodity Policy Analysis Fall. 3 credits. Limited to graduate students. Prerequisites: basic training in quantitative methods (Agricultural Economics 710 and 712 or equivalent) and permission of instructor. Offered odd-numbered years.
F 1:25–4. D. Blandford.
A discussion of the structure, use, and usefulness of alternative quantitative methods of commodity policy analysis. Preparing a term paper is an important part of the course.

751 Seminar on Agricultural Policy Spring. 2 credits. Limited to graduate students. Offered alternate years.
M 1:25–3:20. K. L. Robinson.
A discussion of current policy issues related to food and agriculture and techniques appropriate to the analysis of such issues.

752 Readings in Philosophy Spring. 3 credits. Limited to Ph.D. degree candidates.
S 9:05–12. H. E. Conklin.
Readings, selected for their relevance to research in agricultural economics, are chosen from among books such as *Structure of Scientific Revolutions*, *The Theory of Experimental Inference*, *The Nerves of Government*, *Economics as a Science*, and *A Theory of Economic History*.

Quantitative Methods

Attention is directed to related courses in economics, economic and social statistics (ILR), industrial engineering and operations research, mathematics, and statistics and biometry; selected courses particularly relevant to agricultural economics are also listed here.

310 Introductory Statistics Fall. 3 credits.
Prerequisite: ALS 115 or equivalent level of algebra.
Lec, M W F 12:20; lab, M 2:30 or 3:35, T 2:30 or 3:35, or W 2:30 or 3:35. J. M. Conrad.
An introduction to statistical inference including probability concepts, estimation, hypothesis testing, and linear regression.

412 Introduction to Linear Programming Spring. 3 credits. Primarily for juniors, seniors, and M.S. degree candidates. Prerequisite: Agricultural Economics 310 or equivalent.
Lec, M W 10:10; lab, W 1:25–3:20 or 3:35–5:20.
B. F. Stanton.
An introduction to the concepts and computational procedures of linear programming. Emphasis on interpretation of results, model building and data requirements for estimation using standard computer programs. Topics include sensitivity analysis, parametric programming, the transportation problem scheduling, and distribution. Primary applications are made to agriculture and business.

710 Econometrics I Spring. 4 credits. Not open to undergraduates. Prerequisites: Statistics 416 and 601 or equivalent.
Lec, T R 2:30–4:25. W. G. Tomek.
A comprehensive treatment of the classical linear regression model at the level of *Econometric Methods*, by Johnston. Generalized least squares, analysis of covariance, and elementary distributed lag models are introduced. Simultaneous equations estimators constitute about 30 percent of the course. Principles of econometrics are emphasized as a basis for empirical research.

711 Econometrics II Fall. 4 credits. Prerequisite: Agricultural Economics 710 or equivalent. Statistics 417 recommended.
Lec, M W 3:35–5. T. D. Mount.
Coverage beyond that of Agricultural Economics 710 of generalized least squares, models with stochastic regressors, testing linear hypotheses, and the effects of specification errors. Applications include seemingly unrelated regressions, three-stage least squares, estimation with pooled data, models with stochastic coefficients, and distributed lag models. Other topics covered are principal components, factor analysis, and probit and logit analysis, with extensions to deal with multinominal problems.

712 Quantitative Methods I Fall. 4 credits. Prerequisite: Statistics 416 or equivalent. Statistics 417 suggested.
Lec, M W F 11:15; disc, as arranged.
R. N. Bosivert.
A comprehensive treatment of linear programming and its extensions, including postoptimality analysis and the transportation model. Special topics in integer and nonlinear programming, including spatial equilibrium and risk programming models. Input-output models are treated in detail. Applications are made to problems in agricultural, resource, and regional economic problems.

713 Quantitative Methods II Spring. 4 credits. Prerequisite: Agricultural Economics 712 or permission of instructor.
Lec, M W F 9:05–9:55; disc, F 1:25–3.
R. A. Milligan.
A study of quantitative techniques used to solve dynamic problems. The first half of the course is concerned with simulation; the second, with dynamic optimization.

714 Econometric Models Spring. 3 credits. Offered alternate years.
Lec, as arranged. T. D. Mount, W. G. Tomek.
The theory and art of specifying and evaluating econometric models. Topics include economic theory as a guide to model building, evaluating parameter estimates, sequential estimators, and evaluating the forecasting ability of a model. Empirical studies in agricultural economics provide a basis for discussion.

717 Research Methods in Agricultural Economics Spring. 2 credits. Limited to graduate students.
M 1:25–3:20. B. F. Stanton and D. G. Sisler.
Discussion of the research process and scientific method as applied in agricultural economics. Topics include problem identification, hypotheses, sources of data, sampling concepts and designs, methods of collecting data, questionnaire design and testing, field organization, analysis of data, and development of research proposals.

Related Courses in Other Departments

Statistics II (I&LR 311)

Introduction to Computer Uses in Data Analysis (Agricultural Engineering 304)

Matrix Algebra I (Statistics and Biometry 416)

Matrix Algebra II (Statistics and Biometry 417)

Other Courses

380 Independent Honors Research in Social Science Fall or spring. 1–6 credits. Limited to students who have met the requirements for the honors program. A maximum of 6 credits may be earned in the honors program.

499 Undergraduate Research Fall or spring. 1–4 credits. S-U grades optional. Limited to seniors with grade point averages of at least 2.7. Prerequisite: written permission of the staff member who will supervise the work and assign the grade; this permission must be attached to course enrollment material.

Permits outstanding undergraduates to carry out independent study of suitable problems under appropriate supervision.

699 Graduate Research Up to 6 credits. Prerequisites: graduate standing and permission of major adviser.

700–701 Special Topics in Agricultural Economics Fall or spring. Credit to be arranged. Limited to graduate students.
Hours to be arranged. Staff.
A group discussion of areas of special interest in the field of agricultural economics. Students are required to review literature and present oral or written reports or both.

Agricultural Engineering

N. R. Scott, chairman; L. D. Albright, J. A. Bartsch, R. D. Black, J. K. Campbell, J. R. Cooke, E. W. Foss, R. B. Furry, R. W. Guest, W. W. Gunkel, D. A. Haith, W. W. Irish, L. H. Irwin, W. J. Jewell, F. G. Lechner, G. Levine, R. C. Loehr, H. A. Longhouse, R. T. Lorenzen, D. C. Ludington, E. D. Markwardt, W. F. Millier, R. A. Parsons, D. R. Price, G. E. Rehkugler, J. W. Spencer, T. S. Steenhuis, L. P. Walker, M. F. Walter

101 Mechanical Drawing Fall. 3 credits.
Lec, T R 8; lab, W 1:25–4:25. H. A. Longhouse.
Introduction to mechanical drawing including lettering, sketching, multiview drawings, sections, auxiliaries, revolutions, pictorial drawings, elementary descriptive geometry, and the application of these principles to problems. Both machine and architectural drawing conventions are discussed.

110 Farm Metal Work Fall or spring. 2 credits.
Lec, R 9:05; fall labs, M or T 1:25–4:25; spring labs, M T or R 1:25–4:25. F. G. Lechner.
Monday lab, limited to 24 students, includes instruction in the fundamentals of metal lathe work and arc and oxyacetylene welding. Tuesday and Thursday labs, limited to 20 students, include instruction in sheet metal work, pipe fitting, hot and cold metal work, and arc and acetylene welding.

131 Elements of House Design Spring. 3 credits. S-U grades optional. Prerequisite: high school or college physics.
Lec, T R 10:10; lab, T W or R 1:25–4:25.
L. D. Albright.
An introduction to the design process. The basic principles of planning and design of buildings and systems for human habitation, with emphasis on the rural dwelling. Topics include site selection, structural design, water and waste water systems, electrical systems, lighting, heating, solar systems, ventilation, and air conditioning.

132 Farm Carpentry Fall. 2 credits.
Lec, T 9:05; labs, T W or R 1:25–4:25. Each lab limited to 15 students. F. G. Lechner.
Instruction in the fundamentals of farm carpentry, including concrete work, and equipment and buildings constructed of wood. Each student is required to plan and construct an approved carpentry project.

151 Introduction to Agricultural Engineering and Computing Fall. 2 or 3 credits. Prerequisite: one term of calculus or concurrent registration in a calculus course.
Lec, T F 1:25–2:15; rec-lab, T F 2:30–4:25.
G. E. Rehkugler.
An introduction to digital computing with the PL/C and WATFIV languages through the use of computing problems in agricultural engineering subjects and related areas such as environmental technology and agriculture. Basics of PL/C and WATFIV are completed in 10 weeks for 2 credits. The remainder introduces interactive computing and requires the completion of a comprehensive computing problem.

152 Engineering Drawing Spring. 3 credits.
Lec, M W 8; lab, M or T 1:25–4:25.
H. A. Longhouse.
Designed to promote an understanding of the engineer's universal graphic language. The lectures and laboratories develop working knowledge of drawing conventions, drafting techniques, and their application to machine and pictorial drawing problems. Introduction to descriptive geometry and computer graphics is also included.

201 Energy and Man Spring. 3 credits.
Prerequisite: high school or college physics.
Lec, M W F 10:10. L. D. Albright.
Basic concepts of energy. Energy use in agriculture and the food system. Traditional and alternate sources of energy. The energy transfer process is investigated. Topics include heating, cooling, drying, solar radiation, electricity, refrigeration, wind power, and geothermal, OTEC, and biogas production.

208 Application of Physical Sciences I Fall. 3 credits. Prerequisite: a term of calculus and high school physics or a year of college physics.
Lec, T R 10:10; Rec, W F time to be arranged.
D. C. Ludington.
The application of statics, dynamics, mechanics of materials, and fluid mechanics to physical problems in agriculture. Topics include torque, free-body diagrams, friction, energy, stress, bending, shear, fluid flow, and wall pressures. Emphasis is on problem solving.

209 Application of Physical Sciences II Spring. 3 credits. Prerequisite: Agricultural Engineering 208.
Lec, T R 11:15; Rec, W F time to be arranged.
D. C. Ludington.
A continuation of Agricultural Engineering 208. The laws of thermodynamics and principles of energy transfer, psychrometrics, and electricity are covered. Topics include applications in agriculture of the various gas and vapor cycles used in engines and refrigeration, heat conduction through multiple layers, convection, solar radiation, lighting principles, behavior of air and water vapor mixtures, and basic electricity. Solving practical problems is emphasized.

221 Plane Surveying Fall. 3 credits. S-U grades optional. Limited to 90 students, 30 per lab.
Lec, T R 11:15; lab, M T or W 1:25–4:25.
H. A. Longhouse.
An introduction to plane surveying. The use and care of equipment is stressed while doing field problems related to construction and mapping.

271 Applied Hydraulics Spring. 2 credits. S-U grades optional.
Lec, T 9:05; lab R 1:25–4:25. Lab limited to 30 students. R. D. Black.
Elements of fluid mechanics and hydrology as applied to common problems in nature associated with the flow of water. Emphasis is on the practical problems related to flow in pipes, open collection, data analysis, and hydromachinery.

301 Safety and Accident Prevention Spring. 2 credits. S-U grades optional.
Lec, T R 9:05. E. W. Foss.
Educational programs, engineering design, and legal efforts including the federal Occupational Safety and Health Act will be studied. Safety-related organizations ranging from local police and fire departments to international organizations such as National Fire Protection Association and the United Nations are reviewed. Emphasis is on agricultural and rural applications.

304 Introduction to Computer Uses in Data Analysis Spring. 3 credits. S-U grades optional. Prerequisite: one course in college mathematics or statistics or permission of instructor.
T R 11:15; lab to be arranged. R. B. Furry.
An introductory course in computing for those interested in using digital computers to handle data. Topics include description and preparation of data, preparing and processing computer programs, computer attributes and applications, computer library programs, and related computing facilities. No prior knowledge of computers or computing languages is necessary.

305 Principles of Navigation Fall. 4 credits.
3 lecs, disc, and project period, times to be arranged. R. D. Black.
Coordinated systems, chart projections, navigational aids, instruments, compass observations, tides and currents, soundings. Celestial navigation: time, spherical trigonometry, motion of stars and sun, star identification, position fixing, Nautical Almanac. Electronic navigation.

310 Advanced Farm Metal Work Fall or spring. Fall, 1 credit; spring, 1 or 2 credits. Prerequisite: permission of instructor.
Lab, F 1:25–4; for 2 credits a second lab must be arranged. F. G. Lechner.
Fall, advanced machine shop. Spring, advanced welding and metal construction project.

311 Farm Machinery Fall. 3 credits. Not open to freshmen. Prerequisite: high school physics or equivalent.
Lec, T R 10:10. One rec-lab each week, T W or R 1:25–4:25. Each lab limited to 16 students.
W. F. Millier.
A study of the operating principles, use, selection, and methods of estimating costs of owning and operating farm machines. Lab work includes practice in the calibration of planting, fertilizing, and pesticide application machinery and study of the functional characteristics of agricultural machines and machine components.

312 Internal Combustion Engines for Agriculture Spring. 3 credits. Prerequisite: high school physics or equivalent.
Lec, T R 11:15; lab, T W or R 1:25–4:25. Each lab limited to 16 students per lab section. W. F. Millier.
A study of the principles of operation, adjustment, and maintenance of hydrocarbon-fueled single cylinder and multicylinder internal combustion engines. Topics include engine cycles, fuels, lubricants, carburetion, fuel injection systems, ignition, charging circuits, pollution control methods, valve reconditioning, and engine testing.

315 Electricity on the Farm Spring. 3 credits. Prerequisite: Agricultural Engineering 131, Physics 102, or equivalent.
Lec, T R 10:10; lab, T or R 1:25–4:25.
D. C. Ludington.
The application of electricity for light, heat, and power on farms, with emphasis on the principles of the operation, selection, and installation of electrical equipment for the farmstead.

321 Soil and Water Conservation Spring. 2 credits. S-U grades optional. Must be taken with Agronomy 321.
Lec, F 8; disc-lab, M or T 1:25–4:25. Additional labs offered if enrollment requires. Instructor to be assigned.
A study of the principles and practices used in the solution of soil and water conservation problems. Both farm and nonfarm problems are explored. Engineering aspects of erosion control, water management, water storage, and drainage are examined.

325 Introduction to Environmental Pollution Spring. 3 credits. S-U grades optional.
M W F 9:05. D. C. Ludington.
A general course dealing with impairment of the environment by human wastes. The causes and effects of air, water, and soil pollution are discussed. Fundamental factors underlying waste production, abatement, treatment, and control are included. Wastes from urban, rural, and industrial areas are used to illustrate the factors.

331 Farmstead Production Systems. Fall. 3 credits. S-U grades optional.
M W F 8. R. T. Lorenzen.
A study of layout, material handling, and environment associated with agricultural production on the

farmstead. Planning and design techniques pertaining to biointrinsic and integrated systems are emphasized.

332 Farm Buildings Design Fall. 2 credits. Prerequisite: concurrent or previous registration in Agricultural Engineering 331.
Lec-lab, R 1:25–4:25. R. T. Lorenzen.
Structural and thermal design of buildings used for farmstead production systems. Wood is emphasized as a structural material. For students with no background in statics or properties of structural materials.

371 Introduction to Hydrology Spring. 2 credits. S-U grades optional.
Lec, R 9:05; lab, T 1:25–4:30. T. S. Steenhuis.
Elements of water and nutrient flow as applied to common problems. Emphasis is on understanding of hydrological cycle, runoff mechanism, and rainfall and runoff probabilities.

400 Special Problems in Agricultural Engineering Fall or spring. 1 credit or more. Normally reserved for seniors in upper two-fifths of their class; undergraduates must attach to their course enrollment material written permission from the staff member who will supervise the work and assign the grade. Prerequisite: adequate ability and training for the work proposed.
Staff.
Special work in any area of agricultural engineering on problems under investigation by the department or of special interest to the student, provided, in the latter case, that adequate facilities can be obtained.

401 Career Development in Agricultural Engineering Fall. 1 credit. S-U grades optional. Limited to seniors.
Lec, T 12:20. W. W. Gunkel.
A presentation and discussion of the opportunities and qualifications for and responsibilities of positions of service in the various fields of agricultural engineering.

414 Power Transmission Systems Spring. 2 credits. Limited to 16 students. Prerequisite: Agricultural Engineering 312.
Lec, F 12:20; lab, F 1:25–4:25. W. F. Millier.
A study of the principles and operation of hydraulic and mechanical power transmission systems used in agricultural tractors and equipment. Hydraulic power transmission includes system components, circuit diagrams, hydrostatic transmissions, and system analysis. Mechanical power transmission includes clutches, brakes, parallel shaft and planetary transmissions, traction, and drawbar horsepower.

461 Agricultural Machinery Design Fall. 3 credits. Prerequisite: mechanical design or equivalent.
Lec, T R 10:10; lab, F 1:25–4:25. W. W. Gunkel.
The principles of design and development of agricultural machines to meet functional requirements. Emphasis is given to computer-aided analysis and design, stress analysis, selection of construction materials, and testing procedures. Engineering creativity and agricultural machine systems are also stressed.

462 Agricultural Power Spring. 3 credits. Prerequisite: engineering mechanics (dynamics) or equivalent.
Lec, T R 10:10; lab, F 1:25–4:25. W. W. Gunkel.
Use of energy in agriculture. Emphasis is given to basic theory and anaylsis and testing of internal combustion engines and suitable components for use in farm tractors and other power applications. Soil mechanics related to traction and vehicle mobility; economics and human factors in design will be considered.

[465 Processing and Handling Systems for Agricultural Materials Fall. 3 credits. Offered in alternate years. Not offered 1979–80.
Lec, T R 11:15; lab, T 2:30–4:25. R. B. Furry.
Drying, psychrometrics, fluid flow measurement, material handling applications, with an introduction to dimensional analysis and controls for agricultural applications. Problem solutions employ both analog and digital computers.]

466 Engineering Design and Analysis of Food Processing Equipment Spring. 3 credits. Prerequisite: Food Science 302, its equivalent, or concurrent enrollment in an engineering curriculum.
T R 9:05, W 1:25–4:25. G. E. Rehkugler.
The analysis and design of food-processing equipment from the point of view of selecting and designing equipment appropriate for transporting or modifying a food product.

471 Soil and Water Engineering Fall. 3 credits. Prerequisite: hydrology and soils or permission of instructor.
Lec, T R 9:05; lab, W 2:30–4:25. M. F. Walter.
The application of engineering principles to problems of soil and water management. Hydrology, design and construction of erosion control systems, channel stabilization, small reservoirs, earth embankments, drainage, and hydraulic structures.

475 Introduction to Environmental Systems Analysis Fall. 3 credits. Prerequisite: a year of calculus.
M W F 11:15. D. A. Haith.
Introduction to systems analysis and its application to environmental quality management. Simulation, linear programming, and dynamic programming applied to problems in water and air pollution control, solid waste disposal, agricultural wastes, etc.

481 Agricultural Structures Design Spring. 3 credits. Prerequisite: Engineering CEE G301.
Lec, T R 1:25; disc-lab, R 2:30–4:40.
R. T. Lorenzen.
Application of basic structural concepts to design of agricultural structures. Emphasis on wood structures, including design of trusses, rigid frames, prefabricated panels, and columns.

482 Environmental Control for Animals and Plants Spring. 3 credits. Prerequisite: thermodynamics.
Lec, M W 11:15; lab, F 1:25–4:25. L. D. Albright
Thermal interchanges between animals (including humans) and plants and the environment. Physiological principles affecting thermal comfort and health. Ventilation, air conditioning, psychrometrics, solar energy, and weather phenomena.

491 Highway Engineering Fall. 3 credits. Prerequisite: Civil Engineering D301 or permission of instructor.
Lec, W F 12:20; lab, M 12:20–3:20. L. H. Irwin.
A study of highway systems, planning, economy analysis, road location and geometric design, traffic engineering, drainage design, and soil engineering. Introduction to highway materials, pavement design, and highway maintenance.

[492 Bituminous Materials and Pavement Design Spring. 3 credits. Prerequisite: concurrent registration in Civil Engineering D301 or permission of instructor. Not offered 1979–80.
Lec, W F 12:20; lab, M 12:20–3:20. L. H. Irwin.
Properties of asphalts, aggregates, and bituminous mixtures; bituminous mixture design. Seal coat and surface treatment design. Soil stabilization methods. Flexible pavement design methods, rigid pavement design methods, pavement design for frost conditions.]

501–502 M.P.S. Project Fall and spring. Up to 6 credits.
Hours to be arranged. Staff.
A comprehensive project utilizing applied problems pertinent to agricultural engineering. Required of each M.P.S. candidate in the field.

551–552 Agricultural Engineering Design Project Fall and spring. 6 credits. Prerequisite: admission to the M.Eng.(Agr.) degree program or equivalent preparation.
Hours to be arranged. L. D. Albright and staff.
Comprehensive design projects dealing with existing engineering problems in the field. Emphasis is on the formulation of alternative design proposals that include consideration of economics, nontechnical factors, engineering analysis, and complete design for the best design solution.

600 Special Topics in Agricultural Engineering Fall or spring. 1–6 credits. S-U grades optional. Undergraduates must attach to their course enrollment material written permission from the staff member in charge of the course. Prerequisite: permission of instructor.
Hours to be arranged. Staff.
Topics are arranged by the staff at the beginning of the term.

651 Similitude Methodology Fall. 3 credits.
Lec, M W 8; lab to be arranged. R. B. Furry.
Similitude methodology, including the use of dimensional analysis to develop general equations to define physical phenomena; model theory, distorted models, and analogies, with an introduction to a variety of applications in engineering.

652 Instrumentation Spring. 3 credits. Prerequisite: electrical systems or permission of instructor.
Lec, T R 12:20; lab to be arranged. N. R. Scott.
The application of instrumentation concepts and systems to physical and biological measurements. Characteristics of instruments, signal conditioning and interfacing, shielding and grounding, transducers, data acquisition systems, microprocessors and radiotelemetry are considered.

672 Drainage Engineering Spring. 4 credits. Prerequisite: Agricultural Engineering 471 or permission of instructor. Offered alternate years.
Lec, M W F 10:10; lab, F 1:25–4:25.
T. S. Steenhuis, R. D. Black.
Analysis and design of surface, subsurface, and combined drainage systems, with emphasis on agricultural applications. The elements of surface, channel, and porous media flow are analyzed, as well as entire systems of collectors, storages, pumps, and methods of overflow protection for large areas. Effect of drainage on water quality is reviewed.

[673 Irrigation Engineering Spring. 3 or 4 credits. Prerequisites: Agronomy 200 and Agricultural Engineering 471 or permission of instructor. Offered alternate years. Not offered 1979–80.
Lec, M W F 10:10; lab, F 1:25–4:25. R. D. Black, T. S. Steenhuis.
Analysis and design of irrigation systems. Soil-plant-water relationships, water quality, water supplies, water delivery systems, and water distribution system are analyzed.]

677 Treatment and Disposal of Agricultural Wastes Fall. 3 credits. Prerequisite: permission of instructor.
3 lecs, hours to be arranged. Staff.
Emphasis is on the causes of agricultural waste problems and the application of fundamentals of treatment and control methods to minimize related pollution. Fundamentals of biological, physical, and chemical pollution control methods are applied to animal, food production, and food-and fiber-processing wastes, using examples of designs of management systems.

678 Nonpoint Source Water Quality Models Spring. 1–3 credits. S-U grades optional. Limited to upperclass or graduate students. Prerequisites:

computer programming, a year of calculus, and permission of instructor.
Lec, M W F 9:05. D. A. Haith.
Mathematical models for analysis of agricultural and urban nonpoint sources. Three 1-credit sequential units: (1) stormwater models — computer models of runoff and moisture balances; (2) basic nonpoint source models — simple models for urban and agricultural runoff, land application of wastes; (3) agricultural simulation models — pesticides, nutrients, and salinity.

679 Use of Land for Waste Treatment and Disposal Spring. 3 credits. Prerequisite: permission of instructor.
Lec T R 3:35–4:50. Staff.
Covers the socio-legal-technical factors, the properties of land and crop systems that make land application of wastes a viable alternative, and the use of fundamentals in the development of regulations and the design of full-scale units.

[685 Biological Engineering Analysis Fall. 4 credits. Prerequisite: Engineering T&AM 311, or permission of Instructor. Not offered 1979–80.
T R 10:10–11:40. Staff.
Engineering problem-solving strategies and techniques are explored. The student solves several representative engineering problems that inherently involve biological properties. The mathematical modeling emphasizes problem formulation and interpretation of results. The student's knowledge of fundamental principles is used extensively. Principles of feedback control theory are applied to biological systems.]

700 General Seminar Fall or spring. Noncredit.
M 12:20. N. R. Scott.
Presentation and discussion of research and special developments in agricultural engineering and related fields.

750 Orientation for Research. Fall. 1 credit. S-U grades only. Limited to newly joining graduate students.
Lec: first 5 weeks, M 3:20; remainder, M R.
G. E. Rehkugler.
An introduction to departmental research policy, programs, methodology, resources, and degree candidates' responsibilities and opportunities.

761 Power and Machinery Seminar Spring. 1 credit. S-U grades only. Limited to graduate students. Prerequisite: permission of instructor.
Hours to be arranged. W. W. Gunkel.
Study and discussions of research and new developments in agricultural power and machinery.

771 Soil and Water Engineering Seminar Fall or spring. 1–3 credits. S-U grades optional. Prerequisite: graduate status or permission of instructor.
Hours to be arranged. Staff.
Study and discussion of research or design procedures related to selected topics in irrigation, drainage, erosion control, agricultural hydrology, and water quality.

775 Agricultural Waste Management Seminar Spring. 1 credit. S-U grades only. Prerequisite: permission of instructor.
Hours to be announced. Staff.
Management of agricultural wastes, with emphasis on physical, chemical, biological, and economic factors affecting waste production, treatment and handling, utilization, and disposal.

781 Agricultural Structures and Related Topics Seminar Spring. 1 credit. S-U grades only. Prerequisite: graduate status or permission of instructor.
Disc to be arranged. N. R. Scott.
Consideration of farmstead production systems, with emphasis on biological, economic, environmental, and structural requirements.

785 Biological Engineering Seminar
Spring. 1 credit. S-U grades only. Prerequisite: graduate status or permission of instructor.
Disc to be arranged. N. R. Scott, J. R. Cooke.
The interaction of engineering and biology, especially the environmental aspects of plant, animal, and human physiology, are examined in order to improve communication between engineers and biologists.

Agronomy

R. F. Lucey, chairman; M. Alexander, W. H. Allaway, R. W. Arnold, D. R. Bouldin, W. B. Duke, J. M. Duxbury, G. W. Fick, D. L. Grunes, W. K. Kennedy, W. R. Knapp, J. Kubota, D. J. Lathwell, E. R. Lemon, A. C. Leopold, D. L. Linscott, M. B. McBride, R. D. Miller, R. L. Obendorf, G. W. Olson, J. H. Peverly, W. S. Reid, T. W. Scott, R. R. Seaney, T. R. Sinclair, P. L. Steponkus, F. N. Swader, A. Van Wambeke, R. M. Welch, M. J. Wright, R. W. Zobel

Atmospheric Sciences

See page 15.

Crop Science

311 Grain and Cash Crops Fall.
4 credits. Prerequisite: Agronomy 200 or Biological Sciences 241.
Lec, M W F 10:10; lab, M T W R or F 1:25–4:25. One or two field trips during lab periods until 5 or on weekends. Fall, R. L. Obendorf.
Principles of field crop growth, development and maturation, species recognition, soil and climatic adaptations, liming and mineral nutrition, weed control, cropping sequences, management systems, and crop improvement are considered. Grain, protein, fiber, and sugar crops are emphasized.

312 Feed Crops Spring. 4 credits. Prerequisites: Agronomy 111 or equivalent. Animal Science 112 is recommended.
Lec, M W F 8; disc, T 9:05. G. W. Fick.
The production and management of crops used for livestock feed are considered in terms of establishment, growth, maintenance, harvesting, and preservation. Forage grasses, forage legumes, and corn are emphasized, and consideration is given to their value as livestock feed in terms of energy, protein, and other nutritional components.

314 Production of Tropical Crops Spring. 3 credits. Prerequisite: a course in crop production.
Lec, M W F 10:10. M. J. Wright.
An introduction to the characteristics and culture of the principal food staple crops of the tropics and subtropics and of some of the crops grown for export. Vegetables and fruits are not emphasized.

315 Weed Science Spring. 3 credits. Prerequisites: Agronomy 111 and 200, and Biological Sciences 103 and 104 or Biological Sciences 145.
Lec, T R 8; lab, M T or W 2–4:25. W. B. Duke.
Principles of weed science are examined. Emphasis is given to (A) weed ecology; (B) chemistry of herbicides in relation to effects on plant growth; and (C) control of weeds in all crops. Lab covers factors that affect herbicide activity and includes some weed identification.

371 Undergraduate Research in Crop Science
Fall or spring. Credit to be arranged. Written permission from the staff member who will supervise the work and assign the grade must be attached to course enrollment material.
Hours to be arranged. Staff.
Independent research on current problems selected from any phase of crop science.

610 Physiology of Environmental Stresses
Spring. Prerequisite: Biological Sciences 242 or 341. 3 credits. Offered alternate years.
Lec, T R 10:10. P. L. Steponkus.
A study of the responses of plants to environmental stresses, including chilling, freezing, high temperature, and drought. Emphasis is on the physiological and biochemical basis of injury and plant resistance mechanisms at the whole-plant, cellular, and molecular levels.

611 Crop Simulation Modelling
Fall. 3 credits. Offered alternate years. Prerequisite: Biological Sciences 242 or 341. Computer programming recommended.
M W F 11:15. G. W. Fick.
A study of existing crop models is followed by development and refinement of programs representing the students' work. The computer language CSMP is used. Emphasis is on quantitative formulation and testing of complex hypotheses related to crop growth. Carbon exchange, transpiration, microclimate, soil water supply, root functions, and dry-matter distribution in growing crops are covered.

[613 Ecology and Physiology Yield Fall. 2 credits. Prerequisites: Agronomy 111 and 200 and Biological Sciences 242. Offered alternate years. Not offered 1979–80.
Two 2-hour class meetings a week for last 10 weeks, hours to be arranged. Staff.
A study of special techniques used to obtain and analyze physiological data on crop plant responses to environmental conditions occurring in the field.]

651 Special Topics in Crop Science Fall or spring. 1–6 credits. S-U grades optional. Undergraduates must attach to their course enrollment material written permission from the staff member who will supervise the work and assign the grade.
Hours to be arranged. Staff.
The topic is arranged at the beginning of the term for individual study or for group discussions.

761 Graduate Research in Crop Science Fall, spring, or summer. Credit by arrangement. Limited to members of the graduate field.
Hours by arrangement.

790 Agronomy Seminar Noncredit.
See course description in soil science section below.

Related Courses in Other Departments

Forages of the Tropics for Livestock Production (Animal Sciences 403)

Special Studies of Problems of Agriculture in the Tropics (International Agriculture 602)

Soil Science

200 Nature and Properties of Soils Fall or spring. 4 credits. S-U grades optional. Prerequisites: Chemistry 103, 207, or 215.
Lec, M W F 9:05; lab, M T W R or F 1:25–4:25. Fall, D. J. Lathwell; spring, T. W. Scott.
A comprehensive introduction to the field of soil science, with emphasis on scientific principles and their application in solutions of practical soil management problems.

301 Identification, Appraisal, and Geography of Soils Fall. 4 credits. S-U grades optional. Prerequisite: Agronomy 200 or permission of instructor.
Lec, M W F 10:10; lab, W 2–4:25. Field trips.
M. E. Collins.
The soil as a natural body. Principles of identification and classification of geographic units of soil and interpretation of such units for applied objectives. Geography of major kinds of soil of North America in

relation to environment and cultural patterns. Lab exercises and field trips to assist in identifying and interpreting soils.

321 Soil and Water Conservation
Spring. 2 credits. S-U grades optional. Prerequisite: Agronomy 200 and concurrent registration in Agricultural Engineering 321.
M W 8. W. H. Allaway.
A study of the principles and practices used in soil and water conservation, agronomic aspects of erosion control, water management, storage, drainage, and irrigation.

324 Soil Fertility Management Fall. 3 credits. Prerequisite: Agronomy 200 or permission of instructor.
M W F 9:05. D. R. Bouldin.
An integrated discussion of soil–crop yield relationships, with emphasis on the soil as a source of mineral nutrients for crops and the role of fertilizers and manure in crop production.

331 Aquatic Plant Management Fall. 3 credits. Prerequisites. Biological Sciences 101–102 and Chemistry 103–104 or equivalents.
T R 11:15, T 1:25–4:25. J. H. Peverly.
The chemistry and physiology of higher aquatic plants are studied, from the inorganic solid, solution, and gaseous phases of the environment to cellular and subcellular levels of plants. Application of the basic physical and chemical concepts, presented to predict effects on aquatic plant growth, are illustrated in lab and field situations.

401 Geography and Appraisal of Soils of the Tropics Spring. 3 credits. S-U grades optional. Prerequisite: Agronomy 200 or equivalent.
Lec, M W 12:20; disc, F 2:30–4:25.
A. Van Wambeke.
The character of principal kinds of soils in the major regions of the tropics. Soil properties are related to the position in the landscape and to profile genesis. Emphasis is on soil properties as a basis for interpretation of crop management requirements and production potential. Lectures introduce principles whose applications are examined through discussions, problem solving, and independent reading.

[403 Organic Soils Fall. 2 credits. Prerequisite: Agronomy 200. Offered alternate years. Not offered 1979–80.
W 1:25–4:25. Some field trips will not return before 5:30. J. M. Duxbury.
A combination of field study and discussion of the genesis, ecology, physical and chemical properties, agricultural uses, and management of organic soils.]

404 Forest Soils Fall. 2 credits. Prerequisite: Agronomy 200. Each section limited to 20 students.
Lec (outdoor lab in Sept. and Oct.), M or T 1:25–4:25. Field trips often will not return until 5:30. J. A. Stanturf.
Ecology of forest and wildland soils, including relationships to soil development, vegetation, and land use. First half of the course consists of local field trips and exercises.

406 Soil Microbiology (Lectures) Spring. 3 credits. Prerequisite: Agronomy 200 or Microbiology 290. Offered alternate years.
M W F 10:10. M. Alexander.
A study of the major groups of soil microorganisms, their ecological interrelationships, and the biochemical functions of soil organisms.

[410 Microbial Ecology Spring. 3 credits. Prerequisite: an elementary course in some facet of microbiology. Offered alternate years. Not offered 1979–80.
M W F 10:10. M. Alexander.
An introduction to the basic principles of microbial ecology. Attention is given to the behavior, activity, and interrelationships of bacteria, fungi, algae, and protozoa in natural ecosystems.]

450 Special Topics in Soil Science Fall or spring. 1–6 credits. S-U grades optional. Undergraduates must attach to their course enrollment material written permission from the staff member who will supervise the work and assign the grade.
Hours to be arranged. Staff.
The topics are arranged at the beginning of the term for individual study or for group discussions.

470 Undergraduate Research in Soil Science
Fall or spring. Credit to be arranged. Written permission from the staff member who will supervise the work and assign the grade must be attached to course enrollment material.
Hours to be arranged. Staff.
Independent research on current problems selected from any phase of soil science.

[480 Management Systems for Tropical Soils
Spring: 3 credits. S-U grades optional. Prerequisite: Agronomy 401 or permission of instructor. Offered alternate years. Not offered 1979–80.
Lec, W F 8; disc, W 2:30–4:25. A. Van Wambeke.
Physical, chemical, and biological bases for adapting soil management systems, needs, and potential to important kinds of tropical soils. Emphasis is on combinations of practices for managing soil fertility, water, and tilth for crop production. Soils of contrasting properties and environments are studied.]

506 Use of Soil Information and Maps as Resource Inventories Fall. 2 credits. S-U grades optional. Offered alternate years. For anyone interested in using soils.
T R 11:15. G. W. Olson.
Principles, practices, and research techniques in interpreting soil information and maps for planning, developing, and using areas of land.

602 Chemical Methods of Soil Analysis
Spring. 3 credits. Prerequisites: Agronomy 200 and Chemistry 207–208 or equivalents.
T R 1:25–3:30. M. B. McBride.
Lectures and lab exercises present the fundamental concepts and analytical methods of soil chemistry.

[603 Morphology, Genesis, and Classification of Soils Spring. 3 credits. Prerequisite: Agronomy 301 or permission of instructor. Offered alternate years. Not offered 1979–80.
T R 10:30–12. R. W. Arnold.
Principles of soil classification, reactions, and processes of soil genesis, soil taxonomy, and development and significance of major groups of soils of the world.]

606 Advnaced Soil Microbiology Fall. 1 credit. S-U grades only for graduate students. Prerequisite: Agronomy 406 or permission of instructor.
T 12:20. M. Alexander.
Discussions of current topics in special areas of soil microbiology. Particular attention is given to biochemical problems in microbial ecology.

[607 Soil Physics Fall. 3 credits. Prerequisites: Agronomy 200 and a year of college physics or permission of instructor. Offered alternate years. Not offered 1979–80.
M W F 11:15. R. D. Miller.
A study of physical properties and processes in soils, with emphasis on basic principles.]

[608 Water Status in Plants and Soils Fall. 2 credits. S-U grades optional. Prerequisite: permission of instructor. Offered alternate years. Not offered 1979–80.
Lec, 1 hour to be arranged; lab, R 1:25–4:25 or as arranged. R. D. Miller, T. R. Sinclair.
Techniques for field appraisal of the status of water in plants and soil, including methods used in evapotranspiration studies.]

609 Soil Organic Matter Fall. 2 credits. Prerequisites: Agronomy 200 and Chemistry 357–358 or equivalent. Offered alternate years.
T R 9:05. J. M. Duxbury.
A discussion of current concepts of the nature, mode of formation, dynamics, and role of organic matter in soils. Some consideration is given to the behavior of manufactured organic chemicals in the soil environment.

[701 Soil Chemistry and Mineralogy Fall. 3 credits. Prerequisites: Agronomy 200 and a year of physical chemistry, or permission of instructor. Offered alternate years. Not offered 1979–80.
T R 10:10–11:25. M. B. McBride.
Chemical properties of soils, with emphasis on structure and surface chemistry of soil minerals, ion exchange, mineral-solution equilibria, and absorption reactions of soil clays and oxides.]

[724 Soil Fertility Advanced Course Spring. 3 credits. Prerequisite: graduate status with a major or minor in agronomy. Offered alternate years. Not offered 1979–80.
T R 8:30–9:55. D. R. Bouldin.
A study of selected topics in soil-crop relationships, with emphasis on concepts of soil fertility, interpretation of experimental data, and soil fertilizer chemistry.]

760 Graduate Research in Soil Science Fall or spring. Credit by arrangement. Limited to members of the graduate field.
Hours by arrangement.

790 Agronomy Seminar Fall or spring. Noncredit. Required of graduate students majoring or minoring in the department.
T 4.

Related Course in Another Department

Special Studies of Problems of Agriculture in the Tropics (International Agricultural Development 602)

Animal Sciences

Department of Animal Science: R. J. Young, chairman; H. R. Ainslie, B. J. Apgar, D. E. Bauman, D. H. Beermann, W. F. Brannon, W. R. Butler, L. E. Chase, W. B. Currie, J. M. Elliot, R. W. Everett, R. H. Foote, D. G. Fox, R. C. Gorewit, W. Hansel, H. F. Hintz, D. E. Hogue, R. E. McDowell, W. G. Merrill, R. P. Natzke, E. A. Oltenacu, P. A. Oltenacu, R. L. Quaas, J. T. Reid, S. W. Sabin, H. F. Schryver, S. T. Slack, D. R. Smith, C. J. Sniffen, J. R. Stouffer, M. L. Thonney, H. F. Travis, D. R. Van Campen, N. L. VanDemark, P. J. Van Soest, L. D. VanVleck, R. G. Warner

Department of Poultry Sciences: M. L. Scott, chairman; R. E. Austic, R. C. Baker, S. E. Bloom, G. F. Combs, Jr., D. L. Cunningham, R. R. Dietert, H. G. Ketola, J. A. Marsh, C. E. Ostrander, J. M. Regenstein, E. A. Schano, A. van Tienhoven

100 Introductory Animal Science Fall. 3 credits. S-U grades optional. For beginning students.
Lec, W F 10:10; lab, T R F 2–4:25. J. M. Elliot.
An introduction to animal science dealing with domestic animals and with current practices and problems of the livestock and meat industries. The place of the physical and biological sciences in animal agriculture is discussed. Emphasis is on the nutrition, physiology, breeding, and management of dairy cattle, beef cattle, sheep, swine, and horses.

105 Contemporary Perspectives of Animal Science Spring. 1 credit. S-U grades optional. Limited to freshmen, sophomores and first-year transfers.
T 1:25, W 12:20. Staff.
A forum to discuss the contemporary and future role of animals in relation to human needs and career planning.

230 Poultry Biology Spring. 3 credits.
Lec, T R 11:15; lab, W 2–4:25. Field trips during lab periods may last longer. G. F. Combs, Jr.
Designed to acquaint the student with the scope of the poultry industry. Emphasis is on the principles of avian biology and their application in the various facets of poultry production.

265 Horses Spring. 2 credits. Prerequisite: Animal Science 100 or permission of instructor.
Lec, R 9:05; lab, R 1:25–4:25. H. F. Hintz, J. E. Lowe.
Selection, management, feeding, breeding, and training of light horses.

290 Meat and Meat Products Spring. 3 credits.
Lec, T R 9:05; lab, M T or W 1:25–4:25.
J. R. Stouffer.
An introduction to meat science through a study of the characteristics of meat from slaughter to consumption. Structure, composition, inspection, grading, preservation, cutting, and processing are included. A trip to commercial meat plants is taken.

330 Commercial Poultry Production Fall. 1 credit. Prerequisite: Animal Science 100, 230, or permission of instructor. Offered alternate years.
F 2–4:25. Field trips. D. L. Cunningham.
The course is designed to provide an understanding of what takes place and is required in a commercial egg production operation.

360 Beef Cattle Spring. 3 credits. Prerequisite: Animal Science 100, 110, 220, 221, or permission of instructor.
Lec, T R 10:10; lab, M 2–4:25. M. L. Thonney.
Emphasis is on the management of reproduction, nutrition, and selection in beef cattle enterprises. A cattle growth model is studied. Labs acquaint students with the management skills of a beef operation. Students are required to spend several days during the semester feeding, observing calving, and caring for cattle.

365 Seminar on Horse Production Fall. 2 credits. S-U grades optional. Prerequisites: Animal Science 112, 220, 221, and 265, or equivalent. Enrollment limited to 18.
F 1:25–4. H. F. Hintz.
Students present seminars on the management of various types of horse enterprises such as the breeding farm, training stable, and riding stable. One all-day field trip is taken.

370 Swine Fall. 3 credits. Prerequisite: Animal Science 100. Animal Science 112, 220, and 221 recommended.
Lec, T R 11:15; lab and disc, M or T 1:25–4:25 every other week so students can take Animal Science 380 concurrently.
The characteristics of swine and their breeding, feeding, management, and selection. Lab and discussion periods are designed to give the student a practical knowledge of the pig as an animal and of commercial swine production practices.

380 Sheep Fall. 3 credits. Prerequisite: Animal Science 100. Animal Science 112, 220, and 221 recommended.
Lec, T R 10:10. Lab and disc periods, M 1:25–4:25 every other week so students can take Animal Science 370 concurrently. D. E. Hogue.
The breeding, feeding, management, and selection of sheep. Lectures and lab are designed to give the student a practical knowledge of sheep production as well as the scientific background for improved practices.

390 Poultry Problems Fall or spring. 1, 2, or 3 credits. S-U grades optional. Undergraduates must attach to their course enrollment material written permission from the staff member who will supervise the work and assign the grade. Not open to students who have earned 6 or more undergraduate research credits elsewhere in the college.
M. L. Scott.
Investigation of a basic or applied problem in some area of poultry science, including nutrition, genetics, physiology, food science, and management. The student conducts a short research project under the direction of an appropriate staff member. Each student is expected to review pertinent literature, prepare a project outline, conduct the research, and prepare a report.

392 Commercial Meat Processing Fall. 3 credits. Prerequisite: Animal Science 290 or consent of instructor.
Lec, T R 9:05; lab, M T or W 1:25–4:25.
D. H. Beermann.
A study of the classification, formulation, and production of commercially available processed meat products. Physical and chemical characteristics of meat and nonmeat ingredients, their functional properties, various methodologies, microbiology, packaging, handling and storage, and quality assurance are discussed. A trip is taken to commercial meat processing plants.

395 Undergraduate Research Fall or spring. 6 credits maximum during undergraduate career. Not open to students who have earned 6 or more undergraduate research credits elsewhere in the college. Limited to juniors and seniors with grade averages of at least 2.7.
Affords opportunities for students to carry out independent research under appropriate supervision. Each student is expected to review pertinent literature, prepare a project outline, conduct the research, and prepare a report.

396 Undergraduate Teaching Fall or spring. 1 or 2 credits; 4 credits maximum during undergraduate career. Limited to students with grade averages of at least 2.7.
Designed to consolidate the student's knowledge. A participating student assists in teaching a course allied with the student's education and experience. The student is expected to meet regularly with a discussion or lab section, to gain teaching experience, and regularly to discuss teaching objectives, techniques, and subject matter with the professor in charge.

400 Livestock Production in Warm Climates Spring. 3 credits. Prerequisites: either Animal Science 112, 220, and 221 or permission of instructor.
Lec, T R 10:10; disc, W 1:25–3:20.
R. E. McDowell.
An analysis of the limitations the tropical environment imposes on livestock production; restrictions on contributions of animals to farm incomes owing to limitations in genetic potential; feed resources; and social structures. The role of animals on small farms and the interdependence of humans and animals for food, services, and nonfood products are stressed. The application of principles introduced in lectures are examined through discussions, problem solving, and independent study.

401 Seminar Dairy Production Spring. 1 credit. Limited to juniors and seniors.
Hours to be arranged. D. E. Bauman and staff.
Students with the help of faculty complete a study of the research literature on topics of current interest in the dairy industry. Students make an oral presentation of their findings.

402 Undergraduate Seminar Spring. 1 credit. S-U grades optional. Limited to advanced undergraduates.
Hours to be arranged. L. D. VanVleck.
A study of literature pertinent to special topics in animal science. Students are required to review the literature and to present oral and written reports.

403 Forages of the Tropics for Livestock Production Spring. 3 credits. Limited to seniors and graduate students except by permission of instructor. Prerequisite: crop production and livestock nutrition. Offered alternate years.
Lec, T R 12:20; disc., T 1:25. R. E. McDowell, P. J. VanSoest, L. V. Crowder.
A review of tropical grasslands, sown pastures, and fodders and their use as feed resources; grass and legume characteristics; establishment and management of pastures and feed source alternatives; forage quality and utilization; problems of utilization of tropical forages as hays and silages.

440 Application of Systems Analysis in Livestock Production Management Fall. 3 credits. Limited to 30 students. Prerequisites: Either Mathematics 105 and courses in livestock production or permission of instructor.
M W F 9:05. P. A. Oltenacu.
The all-embracing systems concepts are applied to livestock production management. The use of mathematical modeling and simulation in solving management problems is illustrated with practical cases. The course emphasizes the principles behind the systems approach and not the technique's methodology.

600 Research Fall or spring. Credit to be arranged.
Hours to be arranged. All members of animal science program area.

609 Seminar in Poultry Biology Fall or spring. S-U grades only. Limited to graduate students.
Hours to be arranged. Staff.
A survey of recent literature and research in poultry biology.

610 Seminar Fall and spring. 1 credit. S-U grades only. Required of all graduate students with a major or minor in animal science.
M 11:15. Department faculty.

640 Special Topics in Animal Science. Fall or spring. 1 or more credits.
Hours to be arranged. Staff.
Study of topics in animal science more advanced or different from other courses. Subject matter depends on interests of students and availability of staff.

Related Courses in Other Departments

Special Studies on Problems of Livestock Production in the Tropics (International Agriculture 602)

Poultry Hygiene and Disease (Veterinary Medicine 255)

Health and Diseases of Animals (Veterinary Medicine 475)

Animal Breeding and Genetics

221 Introductory Animal Genetics Fall. 3 credits. Prerequisite: a year of college biology.
Lec, T R 9:05; disc, W R or F 2–4:25.
E. A. Oltenacu.
An examination of basic genetic principles and their application to the improvement of domestic animals, with emphasis on the effects of selection and mating systems on animal populations.

321 Seminar on Genetics of the Horse Spring. 1 credit. Prerequisite: Animal Science 265 or permission of instructor. Animal Science 221 or Biological Sciences 281 recommended.
T or W 9:05. L. D. VanVleck.
A discussion of genetics of the horse, with special reference to simply inherited traits and selection for quantitative traits.

419 Animal Cytogenetics Fall. 4 credits. Prerequisite: Animal Science 221, Biological Sciences 281, or permission of instructor.
Lec, T R 9:05; lab, T or W 1:25–4:25, 2 other hours to be arranged. S. E. Bloom.
A study of normal and abnormal chromosomes in higher animals. Lecture topics include chromosome organization, chromosome movement, cytogenetics of abortuses, parthenogenesis, chromosomes and cancer, mitotic and meiotic errors, and human clinical cytogenetics. In labs students obtain chromosome preparations from various animals and use cytochemical and photographic methods for karyotype analysis.

420 Quantitative Animal Genetics Fall. 3 credits.
Lec, T R 11:15; lab, W R or F 2–4:25.
L. D. VanVleck.
A consideration of problems involved in improvement of animals, especially farm animals, through application of the theory of quantitative genetics with emphasis on selection index.

421 Seminar in Animal Genetics Fall. 1 credit. Prerequisite: Animal Science 221 or concurrent registration in Animal Science 420.
Hours to be arranged. L. D. VanVleck, R. W. Everett.
A discussion of applications of principles of quantitative genetics and animal breeding to specific types of animals such as dairy animals, meat animals, and horses.

422 Research Techniques in Quantitative Animal Genetics Fall. 1 credit. Prerequisite: Animal Science 420 or concurrent registration in Animal Science 420.
R 12:20. L. D. VanVleck.
An introduction to methods of research in quantitative genetics and animal breeding, including estimation of heritability, repeatability, and genetic and phenotypic correlations.

430 Artificial Breeding of Farm Animals Fall, starting August 27. 2 credits. Prerequisites: Animal Science 220 and 221 or their equivalent, and permission of the instructor.
Lec, T R 9:05; lab, M T W R F 8:30–4:30 from August 27 to 31. R. H. Foote.
Principles of artificial breeding and practical animal and laboratory experience in semen collection, semen evaluation, semen freezing, and artificial insemination of farm animals.

486 Immunogenetics (also Biological Sciences 486) Spring. 3 credits. Limited to 25 students. Prerequisites: a course in immunology and Animal Science 221 or Biological Sciences 281, or permission of instructor.
Lec, M W F 9:05; disc, W or R 12:20. R. R. Dietert.
The genetic control of a variety of cellular antigens and their use in understanding biological and immunological functions. The genetics of antibody diversity, antigen recognition, immune response, transplantation, and disease resistance.

620 Seminar in Animal Breeding Fall or spring. 1 credit. S-U grades only. Limited to graduate students with a major or minor in animal breeding.
Hours to be arranged.

720 Experimental Methods in Quantitative Genetics and Animal Breeding Spring. 3 credits. Prerequisites: matrix algebra, linear models, and mathematical statistics.
Hours to be arranged. R. L. Quaas.
Estimation of genetic and environmental parameters required to design efficient selection programs. Emphasis is given to interpretation of experimental and survey data with unequal subclass numbers and to prediction of genetic progress resulting from alternative selection methods.

Animal Nutrition

112 Livestock Nutrition Spring. 4 credits. Prerequisite: Chemistry 103 or 207. Animal Science 100 recommended.
Lec, M W F 10:10; lab, M T W R or F 2–4:25.
D. E. Hogue.
An introduction to animal nutrition, covering fundamentals of nutrition, the composition of feeds, and feeding standards and their application to various forms of production in dairy and beef cattle, sheep, swine, and horses.

113 Nutrition of Companion Animals Fall. 1 credit. S-U grades optional. Prerequisite: Animal Science 112 or equivalent.
W 7:30–9:25 p.m. first 7 weeks. H. F. Hintz.
Nutrition of companion animals, with emphasis on the dog and cat. Digestive physiology, nutrient requirements, feeding practices, and interactions of nutrition and disease.

410 Principles of Animal Nutrition, Lectures Fall. 3 credits. Prerequisite: organic chemistry. Biochemistry or concurrent registration in a biochemistry course is recommended.
M W F 8; M 4:30 for students with a scheduling conflict only. 2 discs to be arranged. R. G. Warner.
The principles of nutrition are developed from a discussion of the biochemical and physiological interaction of the nutrients as they apply to the cell and the whole animal. Examples are selected from a broad range of animal species including humans.

411 Principles of Animal Nutrition, Laboratory Fall. 1 credit. Limited to 20 students. Prerequisite: concurrent registration in Animal Science 410.
Hours to be arranged. R. G. Warner, H. F. Hintz, R. E. Austic, H. F. Travis, G. F. Combs, Jr., H. F. Schryver, M. L. Thonney.
Lab problems with animals introduce the student to techniques of experimental nutrition.

415 Poultry Nutrition Spring. 1 credit. Prerequisite: Animal Science 410 or permission of instructor.
F 11:15. G. F. Combs, Jr.
A practical consideration of principles of nutrition applied to feeding poultry, including use of linear programming techniques in diet formulation.

601 Proteins and Amino Acids in Nutrition (also Nutritional Sciences 601) Fall. 3 credits. Prerequisites: either physiology, biochemistry, and nutrition or consent of instructors.
M W F 11:15. R. E. Austic, M. Morrison.
An advanced course in amino acid and protein nutrition with emphasis on the dynamic aspects of protein digestion, amino acid absorption, protein synthesis, amino acid metabolism, and nitrogen excretion. Discussions include nutritional interrelationships, amino acid and protein requirements, assessment of nutritional status, evaluation of protein quality, bioavailability of amino acids, and techniques of amino acid analysis. Emphasis is on basic principles and their application in animal and human nutrition.

603 Nutritional Energetics Spring. 2 credits.
M W 10:10. J. T. Reid.

604 Vitamins Fall. 2 credits.
T R 10:10. M. L. Scott, G. F. Combs, Jr.
A discussion of the chemistry, biochemistry, and physiological functions of the vitamins, with emphasis on nutritional aspects.

605 Forages, Fiber, and the Rumen Spring. 4 credits. Prerequisites: either general nutrition and biochemistry or permission of instructor.
M W F 12:20, F 1:25. P. J. Van Soest.
Ruminant nutrition, lower-tract fermentation in mongastrics, nutritional biochemistry of forage plants, fiber, and cellulosic material.

611 Laboratory Work in Animal Nutrition Spring. 4 credits. S-U grades optional. Prerequisites: Animal Science 410 or equivalent, biochemistry, physiology, and quantitative analysis, or permission of instructor.
Lab, M W F 2–4:25 first 8 weeks; hours to be arranged last 7 weeks.
Each student engages in a series of short group and individual research projects with lab and farm animals. Both classical and modern techniques of animal experimentation are considered. The applications of biochemical methods to the solution of animal nutrition problems are stressed.

613 Forage Analysis Spring. 2 credits. Prerequisite: permission of instructor.
Lab, R 2–4. P. J. Van Soest.
Chemical composition and nutritive evaluation of forage plants and related materials. The course includes a term paper summarizing results of independent lab study of either materials or methods.

619 Field of Nutrition Seminar Fall or spring. Noncredit.
M 4:30.
Current research in nutrition is presented by visitors and faculty.

Related Course in Another Department

Lipids (Nutritional Sciences 602)

Advanced Nutrition

A series of nutrition courses is offered jointly by the Department of Animal Science, the Department of Poultry Science, and the Division of Nutritional Sciences.

Prerequisites are either courses in nutrition, physiology, and biochemistry (including intermediary metabolism) or permission of instructor.

Among the topics presented are the biochemical and physiological bases of digestion, absorption, transport and metabolism of nutrients, and species differences. Historical as well as current concepts of nutrition are discussed.

Animal Physiology

200 Animal Physiology Fall. 3 credits. Prerequisite: a year of college biology.
Lec, M W F 9:05. W. B. Currie and staff.
General animal physiology, with emphasis on the large domestic species. Lectures, lab demonstrations, and discussions are designed to relate physiology to production traits. A course in general physiology that provides a basis for nutrition, production, and specialized physiology courses in animal science, but not for more advanced general physiology courses.

220 Animal Reproduction and Development Spring. 4 credits. Prerequisite: a year of college biology or equivalent.
Lec, T R 10:10; demonstration and lab, M T W or R 2–4:25 or F 8–10:30 or 12:20–2:45. Each lab limited to 36 students. R. H. Foote.
An introduction to the comparative anatomy and physiology of reproduction of farm animals. The life cycle from fertilization through development and growth to sexual maturity is studied, with emphasis on physiological mechanisms involved, relevant genetic control, and the application to fertility regulation of animal and human populations. An audio-tutorial lab is available for independent study to prepare for lab experiments.

427 Fundamentals of Endocrinology Fall. 4 credits. Prerequisite: human or veterinary physiology, or permission of instructor.
Lec, T R S 10:10; lab, T or R 1:25–4:25. W. R. Butler.
The physiology of the endocrine glands and the roles played by each hormone in the regulation of normal body processes. The lab work consists of a series of experiments designed to illustrate the basic principles of endocrinology.

451 Physiology and Biochemistry of Lactation Spring. 3 credits. Prerequisite: either Animal Science 220 and Biological Sciences 231 or permission of instructor.
Lec, T R 9:05; lab, R 2–4:25. R. C. Gorewit.
Emphasis is on mammary gland development, anatomy, physiological control of milk secretion, and biochemical synthesis of milk constituents in lab and farm animals.

452 Comparative Physiology of Reproduction of Vertebrates (also Biological Sciences 452) Spring. 3 credits. Prerequisite: Animal Science 427 or permission of instructor.
Lec, M W F 1:25. One preliminary exam at 7:30 p.m. A. van Tienhoven.
Sex and its manifestations. Neuroendocrinology of reproduction, sexual behavior, gametogenesis, fertilization, embryonic development, care of the zygote environment and reproduction, immunological aspects of reproduction.

454 Comparative Physiology of Reproduction of Vertebrates, Laboratory (also Biological Sciences 454) Spring. 2 credits. Prerequisite: Animal Science 452, concurrent registration in Animal Science 452, or permission of instructor.
Hours to be arranged; organizational meeting F 2:30 first week of semester. A. van Tienhoven.
Provides students with an opportunity to independently design and execute experiments with limited objectives.

Related Courses in Other Departments

Introductory Animal Physiology (Biological Sciences 314)

Introductory Animal Physiology Laboratory (Biological Sciences 319)

Dairy Husbandry

250 Dairy Cattle Fall. 3 credits. S-U grades optional.
Lec, T R 10:10; lab, M T R 1:25–4. R. P. Natzke.
Introduces students to the major components of the dairy industry. Topics include breeding, feeding, reproduction, milking, milk secretion, replacement rearing, disease prevention, and record keeping. Laboratories provide limited practice in husbandry techniques.

251 Dairy Cattle Selection and Type Evaluation Spring. 3 credits.
Lab, W 12:20–4:25. 1 all-day S field trip.
S. T. Slack.
Emphasis on conformation characteristics for practice type to achieve wearability for high lifetime production. Practical sessions include planned trips to outstanding herds in the state.

350 Dairy Cattle Production and Management Spring. 3 credits for students with credit in Animal Science 250 or equivalent; otherwise 4 credits. Prerequisites: either Animal Science 112, 220, and 221 or permission of instructor. Animal Science 250 is recommended for students with limited dairy experience.
Lec, M W F 9:05; lab, T W 1:25–4:25. 1 all-day field trip. R. P. Natzke, J. M. Elliot, L. D. VanVleck.
Analysis of breeding, feeding, housing, and management systems for economical production; evaluation of milking systems, including principles of milk secretion and milking procedures. Includes farm visits to observe application of modern technology in operation.

352 Advanced Dairy Cattle Selection Fall. 3 credits. Prerequisite: Animal Science 251 and permission of instructor.
Practice hours to be arranged. S. T. Slack.
Emphasis on additional training in comparative judging for students selected from Animal Science 251 to represent the institution in intercollegiate judging competition.

Related Course in Another Department

Milk Quality (Food Science 351)

Atmospheric Sciences

B. E. Dethier, W. W. Knapp, A. B. Pack, D. A. Paine

Courses in atmospheric sciences are offered by the Department of Agronomy.

101 Basic Principles of Meteorology Fall. 3 credits. Limited to 140 students.
Lec, T R 11:15; lab, M T W or R 1:25–4:25. B. E. Dethier.
A simplified treatment of the structure of the atmosphere: heat balance of the earth; general and secondary circulations; air masses, fronts, and cyclones; hurricanes, thunderstorms, tornadoes, and atmospheric condensation. In the lab, emphasis is on techniques of analysis of weather systems.

103 Basic Principles of Meteorology, Laboratory Fall. 1 credit. Prerequisite: an introductory course in meteorology without a lab.
M T W R 1:25–4:25. B. E. Dethier.
Techniques of analysis of weather systems and the application of dynamical and empirical methods of predicting the daily atmospheric circulation.

202 Dynamic Climatology Spring. 3 credits. Prerequisite: Atmospheric Sciences 101.
M W F 11:15. B. E. Dethier.
The first part of the course is devoted to a description of world climates in terms of global distribution of radiation, temperature, pressure, and wind; precipitation; and air masses. The second part of the course relates climates and climatic anomalies to planetary, regional, and local circulations.

314 Agricultural Meteorology Spring. 3 credits.
T R 10–11:25. A. B. Pack.
An introduction to the relationships of radiant energy, temperature, wind, and moisture in the atmosphere near the ground. The interplay between physical processes of the atmosphere, plant canopies, and soil is examined. Moisture relationships in the atmosphere-soil-plant continuum, the effects of environmental modification, and the bioclimatic requirements of plants are also discussed.

325–326–327–328 Meteorological Communications 325 and 327, fall; 326 and 328, spring. 1 credit each semester. S-U grades optional. Primarily for undergraduate meteorology majors.
Hours to be arranged. Staff.
The student becomes acquainted with facsimile, teletype, and satellite receiving equipment and the data products used in weather forecasting.

411–412 Theoretical Meteorology I and II Fall and spring. 3 credits each semester. Prerequisites: a year each of calculus and physics; 411 is prerequisite to 412 unless permission is obtained from instructor.
M W F 10:10. W. W. Knapp.
Topics include thermodynamics of dry air, water vapor, and moist air; hydrostatics and stability; meteorological coordinate systems; variation of wind and pressure fields in the vertical; winds in the planetary boundary layer; surfaces of discontinuity; mechanisms of pressure change; vorticity and circulation.

[417 Physical Meteorology Fall. 3 credits. Prerequisite: a year each of calculus and physics. Offered alternate years. Not offered 1979–80.
M W F 12:20. W. W. Knapp.
Primarily a survey of natural phenomena of the atmosphere, with emphasis on their underlying physical principles. Topics include composition and structure of the atmosphere, atmospheric optics, acoustics and electricity, solar and terrestrial radiation, and principles of radar probing of the atmosphere.]

430 Synoptic Meteorology Spring. 4 credits. Prerequisites: either Atmospheric Sciences 411 and 412 or permission of instructor.
Lec, M R 11:15; lab, T 9:05–11. D. A. Paine.
The application of quasi-geostrophic theory as a diagnostic and forecast method, including the use of minicomputer products derived from the barotropic, baroclinic, and primitive equation numerical models. Lab work includes surface and upper air analyses and thickness and vorticity computations using radiosonde data documenting macroscale cyclogenesis.

432 Isentropic Theory and Analysis Spring. 4 credits. Prerequisite: 430 or permission of instructor.
Lec, F 11:15; lab, W 9:05–11. D. A. Paine.
The equations of motion, continuity, and energy relationships in constant entropy coordinates. Derivation and construction of adiabatic versus diabatic trajectories. Ertel's potential vorticity theorem evaluated by the quasi-Lagrangian trajectory technique. The lab employs the Atmospheric Sciences 430 storm data to contrast constant pressure and isentropic methods of analysis.

461–462 Undergraduate Research in Meteorology Fall and spring. 1 to 3 credits.
Staff.
Required of honor students in the physical sciences majoring in meteorology.

474 Multiscale Studies of the Atmosphere Spring. 3 credits. Prerequisites: Atmospheric Sciences 411 and 412 and permission of instructor.
Lec, W 1:25; lab, R 9:05–11. D. A. Paine.
A study of the energy-momentum cascade from macroscale to microscale weather phenomena. Data from severe weather outbreaks serve as a practicum in mesoscale analysis.

650 Special Topics in Meteorology and Climatology Fall or spring. 1 or more credits.
Staff.
A study of meteorological topics more advanced than or different from those in other courses. Subjects depend on the background and desires of those enrolled.

691 Seminar in Meteorology Fall or spring. Prerequisite: permission of instructor.
Hours to be announced. B. E. Dethier.
Subjects such as weather modification, paleoclimatology, and atmospheric pollution.

962 Research in Meteorology Fall or spring. 1 or more credits.
Staff.
Thesis research.

Biological Sciences

See page 129.

Communication Arts

C. H. Freeman, chairman; N. E. Awa, R. D. Colle, R. H. Crawford, B. O. Earle, D. A. Grossman, J. E. Hardy, J. E. Lawrence, L. Libretti, D. Martin, R. D. Martin, R. E. Ostman, E. Owens, J. Rowe, T. M. Russo, M. A. Shapiro, R. E. Shew, V. R. Stephen, R. B. Thompson, W. B. Ward, S. A. White, A. M. Wilkinson

150 Writing for Media Fall. 3 credits. Limited to communication arts freshmen and first-year transfer students.
T 9:05; F 1:30–3:30. M. A. Shapiro.
Basic writing for print and broadcast. A back-to-basics approach to writing for clarity and style, using news and feature writing as a framework. Media form and style are analyzed. Frequent writing assignments, both in and outside of class, are given.

200 Theory of Human Communication Fall or spring. 3 credits. S-U grades optional.
Lec, T R 10:10; disc, T or R 12:20. R. B. Thompson.
An introduction to behavioral theories of communication from a multidisciplinary perspective. Contributions from the mass media, anthropology, sociology, psychology, social psychology, rhetoric, and cybernetics are considered.

205 Parliamentary Procedure Fall or spring. 3 credits. Limited to 40 nonfreshman students.
R 1:25–4:25. R. D. Martin.
A study of the principles and practice of parliamentary procedure. Emphasis on practical experience and the importance of a well-run meeting as an integral component of effective communication. Includes recording of minutes, committee assignments, development of bylaws, and meeting evaluations.

210 Communicating Public Information Fall. 3 credits. For those not majoring in communication arts.
M W F 8. J. E. Lawrence.
Examines concepts, methods, techniques, and processes for communicating information to the general public. Explores use of public service time and space through broadcasting, films, publications, and other channels. Emphasis on basic understanding of media requirements and procedures in disseminating public information. Students design information programs.

215 Introduction to Mass Media Fall or spring. 3 credits. S-U grades optional. Limited to 190 nonfreshman students.
M W F 11:15. R. E. Ostman.
History, policies, philosophies, and practice of communication media. The effect of freedom of the press, ethics, libel, and slander on the day-to-day functioning of the media.

230 Visual Communication Fall. 3 credits. Limited to 100 nonfreshman students. Not recommended for art or design majors.
M W F 10:10. V. R. Stephen.
A basic course in the use and importance of visual communication methods and materials in today's society. Posters, charts, displays, photographs, slides, overhead projection, motion pictures, and television are among the topics discussed. Practical projects are assigned.

231 Art of Publication Spring. 3 credits. Each section limited to 30 nonfreshman students. Project materials cost about $5–$25.
M or W 1:25–4:25. V. R. Stephen.
A basic course designed to explore visual concepts that increase communication effectiveness through the printed word. The importance of selecting and coordinating format, layout, typography, and illustrations is stressed. Lectures, a field trip, in-class assignments, and three outside projects examine opportunities and problems in publication design and production.

301 Oral Communication Fall or spring. 3 credits. Each section limited to 24 sophomores, juniors, and seniors.
Disc, M W F 8, 9:05, 10:10, or 11:15; M T W 1:25; M W 9:05 and T 12:20; T R 9:05 and W 12:20; T R 9:05 and W 1:25; T R 10:10 and W 12:20; T R 10:10 and W 1:25; T R 10:10 and W 2:30; T R 11:15 and W 12:20; or T R 11:15 and W 1:25. N. E. Awa, B. O. Earle, C. H. Freeman, L. Libretti, R. D. Martin, E. Owens, J. Rowe, T. M. Russo, R. B. Thompson, and staff.
A study of the basic process and principles of oral communication. Through theory and practice, the student is encouraged to develop self-confidence and competence in public speaking. Provides experience in preparing, delivering, and evaluating oral presentations.

302 Persuasion Fall or spring. 3 credits. Prerequisite: Communication Arts 301.
Lec, M W F 11:15; disc, T R 11:15 or 12:20 or W F 11:15. In weeks discussion sections are held, there is no Wednesday or Friday lecture. B. O. Earle.
The course concentrates on the analysis and understanding of the persuasion events around us. The oral presentations stress the application of various theories of persuasion to the interpersonal communication process.

303 Small Group Communication Spring. 3 credits. Limited to juniors and seniors. Prerequisite: Communication Arts 200 or permission of instructor.
T R 10:10–11; discs to be arranged. N. E. Awa.
Theory and practice in leadership and participation in small-group communication. The course examines the values and limitations of group discussion, collaborative behavior, and conflicts in a democracy.

311 Radio and Television Communication Fall. 3 credits.
W 1:25–4:25. R. D. Colle.
An overview of the roles of radio and television in contemporary society, with particular emphasis on the development, organization, and influence of these media in the United States. Attention is also given to the structure and uses of radio and television in other nations, to provide perspective on the systems here, and to the techniques and constraints involved in program production.

312 Advertising and Promotion Fall or spring. 3 credits. S-U grades optional. Fall, limited to 30 junior, senior, or graduate communication arts majors; spring, limited to 190 juniors, seniors, and graduate students.
T 1:25–4:25. R. E. Ostman.
Examines advertising principles and techniques from both a historical and an economic perspective. Advertising and promotion campaigns and their overall effectiveness as a multiplier in the economy are analyzed. Current advertising trends and the strategy of media planning are examined.

314 Technical and Scientific Writing and Editing Fall or spring. 3 credits. Sections limited to 20 nonfreshman students.
General sections, T R 9:05 and W 11:15, T R 10:10 and W 12:20, or M W F 9:05; biological sciences section, M W F 9:05; engineering and physical sciences section, T R 10:10 and W 12:20; graduate section, T R 9:05 and W 11:15. J. E. Hardy, M. A. Shapiro, A. M. Wilkinson.
Designed to develop skills in writing and editing scientific and technical information. Emphasis is on clarity, accuracy, and appropriate format. Students interpret scientific and technical information through the study of reports, instructions, brochures, and articles. One writing or editing assignment each week.

315 Basic Newswriting for Newspapers Fall and spring. 3 credits. Limited to 30 students. Prerequisite: major in communication or permission of instructor. Typing ability is essential.
R 1:25–4:25. R. E. Shew, director, News Bureau, Cornell University.
Writing and analyzing news stories. A study of the elements that make news, sources of news, interviewing, writing style and structure, new publishing techniques, press problems, and press-society relations.

318 Radio Writing and Production Spring. 3 credits. S-U grades optional.
T 1:25–4:25. D. Martin, general manager, WHCU radio station.
Writing for various radio formats, with emphasis on public affairs programs, including documentaries and interviews. Students tape-record their programs for possible use on radio stations in the state.

319 Television Writing and Production Spring. 3 credits. S-U grades optional. Limited to 25 students. Prerequisite: Communication Arts 311.
R 1:25–4:25. R. D. Colle.
Creation of television information programs, from development of idea through research, scripting, and production.

380 Independent Honors Research in Social Science Fall or spring. 1–6 credits. Limited to undergraduates who have met the requirements for the honors program. A maximum of 6 credits may be earned in the honors program.

401 Communication Law Spring. 3 credits. Limited to junior, senior, and graduate majors in communication arts; others by permission of instructor.
M W F 11:15. D. A. Grossman.
A practical survey of the law governing mass media for those working in the field. Coverage includes restraints on news gathering and publication, privacy, defamation, copyright, broadcast licensing, access, and the Fairness Doctrine.

[**403 Topics in Communication Theory** Fall. 3 credits. Prerequisite: Communication Arts 200 or permission of instructor. Offered alternate years. Not offered 1979–80.
Topics in communication theory, determined by the interest of faculty and students, are discussed.]

404 Psychology of Communication Spring. 3 credits. Prerequisite: Communication Arts 200 or permission of instructor.
M W F 9:05. Staff.
An advanced multidisciplinary study of communication theory. Topics include personal interaction, channels of communication, and effectiveness of message. Study includes intensive analysis of primary sources of major communication theorists.

413 (313) Writing for Magazines Fall or spring. 3 credits. Limited to juniors, seniors, and graduate students.
M 1:25–4:25. Fall, W. B. Ward; spring, M. A. Shapiro.
Intensive fact writing to help students communicate more effectively through the medium of the printed word in magazines. Art and techniques of good writing are studied; magazines in many fields of interest are reviewed. All articles are analyzed and returned to the student to rewrite and submit to a magazine.

420 Print Media Laboratory Fall. 3 credits. Prerequisite: Communication Arts 231, 314, or 413 (313). Limited to junior, senior, and graduate communication arts majors.
R 1:25–4:25. J. E. Hardy, V. R. Stephen.
Writing, editing, and layout principles practiced in publishing the *Cornell Countryman*. Some additional outside work sessions may be required.

421 Broadcast Media Laboratory Fall. 2 credits. Prerequisite: Communication Arts 318 or 319. Limited to junior and senior communication arts majors.
T 1:25–4:25. R. D. Colle.
Emphasis on production of television and radio programs for various audiences.

422 Print Media Laboratory Spring. 3 credits. Prerequisite: Communication Arts 231, 314, or 413 (313). Limited to junior, senior, and graduate communication arts majors.
R 1:25–4:25. J. E. Hardy and V. R. Stephen.
A continuation of Communication Arts 420.

423 Broadcast Media Laboratory Spring. 2 credits.
J. E. Lawrence.
A continuation of Communication Arts 421.

440 Photo Communication Fall or spring. 3 credits. Limited to 25 junior and senior communication arts majors; others by permission of instructor. Supplies will cost approximately $40–$50.
T 1:25–4:25. C. H. Freeman.
Basic photography; camera handling, film processing, projection printing, and photographic lighting. Photojournalism emphasized during the latter part of the course. For those with limited experience in photography. Students are expected to furnish their own supplies and cameras.

495–496 Independent Research Fall or spring. 1–3 credits. Limited to senior and graduate communication arts majors. Seniors must attach to their course enrollment material written permission from the staff member who will supervise the work and assign the grade.
Staff.
Permits outstanding students to carry out independent studies in communications research under appropriate supervision.

601 Intercultural Communication Spring. 3 credits.
T 1:25–4:25. N. E. Awa.
A systematic analysis of sociocultural and psycholinguistic obstacles to effective communication between cultures, subcultures, and ethnic and identity groups. Also examined are the subtleties and complexities of nonverbal behavior in cross-cultural transactions. Examples are drawn from ethnolinguistic and cross-cultural studies.

612 Seminar: Interpersonal Communication Spring. 3 credits.
W 1:25–4:25. N. E. Awa.
A study of recent advances and research in leadership, small-group interaction, and communication networks. New developments are examined as they relate to business, administration, and education.

620 Communication in Organizations Fall. 3 credits. Limited to senior communication arts majors. Prerequisite: permission of instructor.
W 1:25–4:25. S. A. White.
Review of theories, research, and practical systems as they relate to human communication effectiveness in organizations. Includes components of interpersonal communication, intragroup and intergroup communication, communication factors and organizational goals, skill improvement, and media in organizations — software and hardware, networking, and research methodology.

624 Communication in the Developing Nations Fall. 3 credits. Limited to seniors and graduate students.
W 1:25–4:25. R. H. Crawford.
An examination of existing communication patterns and systems and their contributions to the development process. Attention is given to the interaction between communication development and national development in primarily agrarian societies.

626 Comparative Mass Media Spring. 3 credits.
R 1:25–4:25. R. H. Crawford.
An examination of differing national models for media system organization and how each developed in relation to its cultural context. Includes a study of relations with government, mode of support, purposes, scope, and objectives of the media system.

631 Studies in Communication Fall. 3 credits. Limited to graduate students in communication arts; others by permission of instructor.
M 1:25–4:25. R. H. Crawford and staff.
A review of classical and contemporary research in communication, including key concepts and areas of investigation. An exploration of the scope of the field and the interrelationships of its various branches.

632 Methods of Communication Research Fall. 3 credits. Limited to graduate students.
T 1:25–4:25.
An analysis of the methods used in communication research. Emphasis is on understanding the rationale for experimental, descriptive (empirical and nonempirical), and historical-critical research methods.

640 Seminar in Organizational Communication Spring. 3 credits. Open to seniors by permission.
F 1:25–4:25. S. A. White, W. Frank.
Communication functions (human and mass media) in organizational structures of business, industry, labor, education, etc., from the perspectives of academic authorities and managers. Development of conceptual schemes for analyzing components of organizational and human communication effectiveness.

643 Frontiers in Communication Fall. 3 credits.
R 1:25–4:25. R. D. Colle.
A study of recent developments in communication. Emphasis is on the strategic application of the new methods, materials, and technology in visual, print, film, oral, and telecommunication media to contemporary and future problems significantly involving communication.

650 Advanced Communication Seminar Spring. 3 credits. Primarily for graduate students but open to seniors.
W 9:05–12:05. R. D. Colle.
An analysis of special public communication problems faced by different types of organizations, institutions, and companies. Case histories dealing with health, nutrition, and food and agriculture issues, international affairs, government activities, rural development, etc., are used to show how communication programs are organized and executed to help solve problems.

690–691 Communication Teaching Laboratory Fall and spring. 1–3 credits each semester. Limited to juniors, seniors, and graduate students. Prerequisite: permission of the staff member who will supervise the work and assign the grade.
Hours to be arranged.
Designed primarily for students who want experience in teaching communication courses. Students work with an instructor in developing course objectives and philosophy, planning, and teaching.

760 Advanced Communication Projects Fall or spring. 3 credits. Limited to communication arts graduate students. May not be repeated.
Staff.
Independent studies and projects are carried out in conjunction with selected undergraduate courses.

895 Directed Graduate Study Fall or spring. 3–6 credits. S-U grades only.
Staff.

Education

J. P. Ball, chairman; H. G. Andrus, A. L. Berkey, G. J. Broadwell, R. L. Bruce, J. L. Compton, H. R. Cushman, W. E. Drake, J. A. Dunn, A. R. Edsall, J. R. Egner, R. B. Fischer, H. A. Geiselmann, M. D. Glock, D. B. Gowin, E. J. Haller, D. E. Hedlund, J. Millman, J. D. Novak, G. J. Posner, R. E. Ripple, V. N. Rockcastle, K. A. Strike, H. L. Wardeberg

110 Introduction to Psychology Fall or spring. 4 credits.
Lec, M W F 10:10; 2 discs to be arranged.
D. E. Hedlund.
Survey of the major areas of psychological inquiry with emphasis on the personal application of psychological knowledge to the problems of living and to current social issues, including how to be an intelligent consumer of psychological research.

240 The Art of Teaching Spring. 3 credits.
T R 1:25–2:40. G. J. Posner.
This course is designed for all students interested in finding out more about teaching. Teaching is considered an activity in which people of many occupations engage, not limited to schools. Students engage in field experiences to find out what teaching involves (minimum of 1½ hours a week). Class work builds on this experience and provides skills and concepts to make the field experience more profitable.

311 Educational Psychology Fall or spring. 3 credits. S-U grades optional. Prerequisite: introductory psychology.
Fall, M W F 11:15; spring, M W F 9:05. Fall, R. E. Ripple; spring, M. D. Glock.
An introductory survey course. Emphasis is on human learning and the educational process from a psychological point of view. The course is set in a broadly based teaching-learning context appropriate for prospective teachers, youth group leaders, community leaders, and those in the service-helping professions.

312 Learning to Learn Spring. 3 credits. Prerequisite: psychology and educational psychology.
T R 1:25–3. J. D. Novak.
This course is for persons interested in the improvement of educational programs through the application of new knowledge in learning theory. Discussions are based on assigned readings and contributions of class members. The learning theory of David Ausubel is presented in some detail. Other writers on cognitive and affective learning are also studied. A major assignment in the course is the analysis of instruction on the basis of the concepts presented.

317 Psychology of Adolescence Spring. 3 credits. S-U grades optional. Prerequisite: introductory psychology.
T R 1:25–2:40. R. E. Ripple.
A survey of the nature of adolescent development, with emphasis on causal factors of adolescent behavior. Focus is on an examination of the interrelationships among the major aspects of adolescent development, an examination of some of the dominant themes of adolescence, acquaintance with research on adolescent development, and implications for the educational process.

331 Introduction to Teaching Agriculture Spring. 2 credits. Required of persons who plan to enter the student teaching program.

Lec, M 1:25–3; lab to be arranged. W. E. Drake.

An introduction to the origin, development of curricula, and methods of teaching agriculture in secondary schools. Purposes are (1) to provide exploratory experience in teaching agriculture and (2) to prepare prospective teachers for participation in the resident student teaching program leading to teacher certification.

335 Youth Organizations Spring. 3 credits. Prerequisite: basic course in psychology.

Lec, T R 10:10; lab to be arranged. J. P. Bail.

The role of selected youth organizations in providing educational experiences for adolescents. Factors affecting membership in such organizations, including psychological, sociological, and economic aspects, are surveyed. Emphasis is on the various roles the adult volunteer leader may play. Field experience with a recognized youth organization is required.

340 Theories of Teaching Fall. 3 credits.

M W 2:30–3:45. G. J. Posner, K. A. Strike.

This course is for undergraduates with some experience in a teaching situation (e.g., Education 240) who want to conceptualize that experience. The course examines representative theories of teaching and provides an opportunity for the students to develop their own views.

352 Reading Statistics Fall or spring. 1 credit. Prerequisite for spring: concurrent registration in Education 353.

Fall, T 12:20; spring, T R 8:30–9. J. Millman.

An introduction to statistical vocabulary and symbolism frequently used in reporting empirical research in education and other social sciences. Students are taught how to comprehend statistical terminology and results.

353 Introduction to Educational Statistics Spring. 3 credits. Prerequisite: Education 352 or concurrent registration in Education 352, or permission of instructor.

T R 9:05–11. J. Millman.

A study of common statistical procedures encountered in educational inquiry. Includes the mathematical bases, computation, and interpretation of univariate and multivariate descriptive and inferential statistics.

370 Issues in Educational Policy Spring. 3 credits.

M W F 10:10. K. A. Strike.

An examination of the social, political, and economic issues that affect teaching and learning in schools and other settings. Included are such issues as educational opportunity, governance and policymaking, school and community, the economics of education, and the teacher in a social context.

371 Sociology of Education Spring. 3 credits. S-U grades optional.

T R 10:10–11:30. E. J. Haller.

An introduction to the sociological study of schooling and education. Topics include the effects of social factors on educational achievement, the norms and values learned as part of the process of schooling, the relations between students and teachers, and the school's functions in the economic and political systems. All levels of education, from elementary school to the university, are considered.

380 Independent Honors Research in Social Science Fall or spring. 1–6 credits. S-U grades optional. Limited to students who have met requirements for the honors program. A maximum of 6 credits may be earned in the honors program.

Staff.

400 Field Experience Fall or spring. 1–4 credits. S-U grades optional. Undergraduates must attach to their course enrollment material written permission from the faculty member who will supervise the work and assign the grade.

Staff.

Students may engage in planned semiprofessional or professional practice in an educational enterprise. Each student prepares a plan of action including rationale, purposes, and procedures and arranges with a faculty member to supervise and evaluate the field experience.

401 Our Physical Environment Fall or spring. 3 credits. Prerequisite: permission of instructor. Charge for lab supplies, approximately $7.

T 1:25–4:25. V. N. Rockcastle.

A practical, relatively nonmathematical study of some basic relationships and physical interactions in the environment, with emphasis on physics and earth science. Attention is paid to analysis for understanding and techniques for teaching. A two-week session on photography and an individual research project are included. Useful for teachers and environmental educators.

403 Environmental and Natural History Writing Spring. 3 credits. Prerequisite: a course in composition, working knowledge of biology and ecology, permission of instructor. Limited to upperclass and graduate students.

W 7:30–9:25 p.m. R. B. Fischer.

For persons who want a second-level course to improve their ability to reach and influence others through publishing in magazines and newspapers. The class produces a weekly environmental awareness column for a local newspaper and publishes *Environmental Synopsis* as a service to the profession. Subject matter includes outlets for articles, news releases, and preparation of newsletters and brochures aimed at changing environmental attitudes and behavior.

404–405 Field Natural History Fall and spring. 3 credits each semester. Prerequisites: basic biology and ecology and permission of instructor. 404 not prerequisite to 405. Limited to upperclass and graduate students.

Lec, M 10:10; lab, M 1:25, followed by field trip until 4:25. Fall, V. N. Rockcastle; spring, R. B. Fischer.

For persons planning careers in environmental education centers, junior museums, school systems, and field biology teaching. Lectures and weekly field trips acquaint students with northeastern plants, animals, and their environments and methods of using them as teaching resources. Our impact on biological communities and obligations to them are emphasized.

[407 Teaching Elementary Science Fall. 3 credits. Not offered 1979–80.

W 1:25–4:25. V. N. Rockcastle.

An analysis and synthesis of science concepts and related behaviors for children and young adults, with emphasis on sequencing and instruction in school and environmental centers. Includes practical experiences in local schools and youth centers.]

411 Educational Measurement Fall. 3 credits. Prerequisite: permission of instructor.

T 2:30–4:30, 1 additional hour to be arranged. M. D. Glock.

Construction of achievement tests and use of other measuring instruments in the classification and guidance of pupils for improvement of instruction. Opportunities are given to construct tests and evaluate standardized instruments. Emphasis is on the use of formal and informal instruments by the classroom teacher.

[413 Psychology of Human Interaction Fall. 3 credits. Not offered 1979–80.

T R 10:10–12:05. D. E. Hedlund.

Designed to develop skills and understanding of effective interpersonal communication and interaction.]

414 Counseling Psychology Spring. 4 credits. Prerequisite: Introductory psychology, social or personality psychology, and Education 413. Limited to 30 students.

T R 10:10–12:05. D. E. Hedlund.

The processes of counseling are examined from the perspectives of behavioral psychology and humanistic psychology. Research on adult development, college-age and on, is reviewed, and typical adult counseling issues are examined. Implications are drawn for counseling strategy with an adult population, including psychological assessment, establishing therapeutic goals, intervention strategies, and evaluation of outcomes. Alternative models of service delivery such as outreach, consultation, and psychoeducation are emphasized.

430 (433) Special Problems in Agricultural Education Fall or spring. 1–3 credits. S-U grades optional.

Hours to be arranged. Staff.

An opportunity to study individually selected problems in agricultural education.

432 Teaching Agriculture: Methods, Materials, Practice Fall. 9 credits. Prerequisite: Education 331. Education 434 may be taken concurrently.

M T W R F 8–3. A. L. Berkey and staff.

Directed participation in teaching agriculture at the secondary school level. Program includes an intensive four-week on-campus period where methods and materials of teaching agriculture are treated in detail, combined with a ten-week period in a student teaching center. Includes evaluation of area resources, instructional materials and facilities, development of curricula, directing work experience, planning instruction, and advising youth organizations.

434 Adult Education Programs in Agriculture Fall. 3 credits. Prerequisite: concurrent registration in Education 432.

Lec to be arranged. H. R. Cushman.

Determining instructional needs, planning programs of instruction, teaching in groups, giving on-the-job instruction, and evaluating adult education programs in agriculture.

435 Educating for Community Action Spring. 3 credits.

T R 10:10–12:05. R. L. Bruce.

The design and execution of educational aspects of community action programs. Deals with the identification and statement of educational goals, selection of teaching strategies, and evaluation of outcomes.

445 Curriculum Design Fall. 3 credits. Education 545 may be taken concurrently.

T R 10:10–11:30. G. J. Posner.

A general practical approach to course planning. Readings, group discussions, workshops, and individual conferences centering on each student's project. This project consists of designing a course in a subject area, for an age level and an institutional setting of the student's choosing.

446 Implementing Instruction Spring. 2 credits.

Lec-lab, W 1:25–4:25. V. N. Rockcastle.

A study of the elements of effective instruction in the lecture, laboratory, seminar, field trip, and other modes of instruction. Practice in developing and presenting various modes of instruction, with critiques by the class.

472 Philosophy of Education Fall. 3 credits.

T 2:30–4:25. K. A. Strike.

A study of central issues in the philosophy of

education. Questions of ethics, political philosophy, and the theory of knowledge are examined, and the implications for education assessed.

473 Contemporary Philosophy of Education Spring. 3 credits.
M W 11:15; disc, 1 hour to be arranged.
D. B. Gowin.
The topic is value concepts. Issues of value in education (values clarification, behavior modification, moral development) are treated philosophically by drawing on normative concepts of value (e.g., self-interest, utility, freedom, rights and duties, justice) from ethics and social philosophy. A theory of value for education is discussed.

475 Political and Social Philosophy of Education Spring. 3 credits. Offered alternate years.
T 2:30–4:25. K. A. Strike.
An examination of philosophical viewpoints on political and social ideals, such as liberty and equality, and an application of the results to educational institutions.

477 Law and Educational Policy Spring. 3 credits.
T 2:30–4:30. K. A. Strike.
A study of recent federal court decisions concerning education. Emphasis on examining legal issues against a background of related educational theory and in terms of the consequences of legal decisions for the development and operation of educational institutions.

500 Informal Study Fall or spring. 1–3 credits. S-U grades optional. Undergraduates must attach to their course enrollment material written permission from the faculty member who will supervise the work and assign the grade.
Staff.
A student may, with approval of a faculty adviser, study a problem or topic not covered in a regular course or may undertake tutorial study of an independent nature in an area of educational interest.

511 Educational Psychology Fall. 3 credits. S-U grades optional. Prerequisite: introductory psychology.
M W F 1:25. R. E. Ripple.
A basic survey course for graduate students. Emphasis on psychological factors involved in human learning and the educational process. Set in a broad-based conceptual model of any behavioral setting for learning. Appropriate for those seeking an introduction to educational psychology or a refresher course in contemporary educational psychology.

512 Standardized Tests: Use and Interpretation Fall. 3 credits.
R 3:35–5:15, 1 additional hour to be arranged.
H. G. Andrus.
For teachers, counselors, or personnel majors who plan to work with standardized tests.

513 A Theory of Education Fall. 3 credits. Prerequisite: Education 311 or 511, or permission of instructor.
T R 10:10–11:30. J. D. Novak.
Presents a coherent theory of education combining concepts from philosophy, psychology of learning, curriculum and instruction, together with selected writings on affective development. Designed to assist graduate students and teachers to prepare better instructional material and to design better educational research, based on theory. Classes are conducted in seminar style.

[514 Group Processes in Education Spring. 3 credits. S-U grades optional. Prerequisite: permission of instructor. Not offered 1979–80.
T R 10:10–12:20. D. E. Hedlund.
Consideration of effective group membership and leadership, with emphasis on the theory and practice of facilitating small-group processes. Included are the design and evaluation of structured group exercises for the classroom, the use of groups in counseling, and an examination of the consulting role as an educational strategy.]

515 Affective Education Spring. 3 credits. Prerequisite: permission of instructor. Offered alternate years.
M W 1:25–3:30. D. E. Hedlund.
This course examines the conceptual base and the methodology of teaching for objectives in the affective realm. The first part of the semester is devoted to the intrapersonal dynamics of individual development and the relationship of affective and cognitive learning. The second part focuses on the interactive nature of the teaching-learning transaction and the effective use of small-group dynamics in teaching. The capability to design teaching-learning experiences that incorporate affective objectives is a major goal. The course is largely experiential, providing participation in a variety of approaches to affective education.

519 Methods of Educational Inquiry Fall. 3 credits. Prerequisite: statistics, Education 352, or concurrent registration in Education 352.
T R 2:30–4. J. Millman.
Techniques of empirical research in education, including design of experiments and methods of data collection. Provides an opportunity for students to write a research proposal and for small groups to conduct a ministudy. Students are taught how to plan and conduct an empirical research study and how to critique the work of others.

535 Continuing Education Programs Spring. 3 credits. Prerequisite: some work experience.
W 1:20–4. G. J. Broadwell.
An overview of selected theories, principles, and strategies applicable to problems of administering and supervising autonomous professionals in decentralized informal educational organizations and change agencies. Content includes management functions, managerial leadership styles, management by objectives, performance appraisal, collective negotiations, decision making, and conflict management. Lectures, films, a variety of readings, and group discussion are augmented by individual papers oriented to application of conceptual information.

543 Structure of Knowledge and Curriculum Spring. 3 credits. Prerequisite: permission of instructor.
M W 12:20–2:10. D. B. Gowin.
A method for the critical analysis of knowledge and value claims embedded in primary sources is presented. Students use this method of analysis on materials chosen according to their own background or interest. Students develop their materials to the point where they could be used for instructional purposes. A special theory of curriculum developed by the instructor is presented.

544 Teaching Mathematics Spring. 3 credits.
T R 3:35–4:50. H. A. Geiselmann.
Intended to provide competence in presenting mathematics using various approaches–discovery, audiovisual aids, laboratory techniques, individualized instruction, use of games, puzzles; acquaintance with teaching resources; geometrical constructions; discussion of the slow learner. Each student selects a project and presents it to the class.

545 Curriculum Theory and Analysis Fall. 3 credits. Prerequisite: Education 311 or 511, concurrent registration in Education 511, or permission of instructor.
M W 10:10–11:30. G. J. Posner.
An examination of the basic elements involved in making curriculum decisions and an analysis of current approaches to curriculum. Students learn to analyze a curriculum in the context of a conceptual framework. This course is the basic graduate course in curriculum.

546 Evaluation for Program Management Spring. 3 credits. S-U grades optional.
M 2:30–5. R. L. Bruce.
Primary attention is given to educational and other community change programs, but inferences to other program management tasks are made.

561 Administration of Educational Organizations Fall. 3 credits.
W 3:35–6. E. J. Haller.
Perspectives on the administration of educational organizations. Consideration of classic and contemporary organization theories and their application to both public and higher education. Intended for students who are considering careers as educational administrators as well as for those who want to further their understanding of schools as organizations.

[563 Governance of Public Education Fall. 3 credits. Offered alternate years. Not offered 1979–80.
W 3:35–6. E. J. Haller.
Consideration of the structure of control in public education. Relationships among federal, state, and local agencies and the administrative roles in school districts. Considerable attention is directed to social and political analyses of the community.]

564 Educational Finance Fall. 3 credits. S-U grades optional.
W 9–11. Instructor to be announced.
Attention is focused on tasks and procedures involved in budgeting, support systems, allocation, control, accountability, and the measurement and reporting of benefits and productivity. An opportunity for individuals to focus on their own areas of interest, such as occupational education, the two-year college, the secondary school, or higher education.

[569 Personnel Development: Issues in Higher Education Spring. 3 credits. Not offered 1979–80.
R 3:35–6. H. L. Wardeberg.
An examination of selected issues that affect the administration and development of academic and nonacademic personnel in continuing and higher education institutions.]

574 History of American Education Fall. 3 credits.
M 3:35–5:15. Instructor to be announced.
An examination of American schools, colleges, and other educative agencies from colonial beginnings to the present. An attempt is made to view education in the context of the evolution of American norms and values.

575 Educational Policy Development and Decision Making Fall. 3 credits. S-U grades optional.
R 3:35–5:30. E. J. Haller.
This course provides an introduction to the policymaking process in and around the educational institution. After a consideration of the nature of public policy, topics included are governmental responsiveness, power and influence in policymaking, political parties and interest groups, and administration as policymaking. The class is organized as a seminar. Each student prepares and presents a paper relevant to one of the topics considered.

600 Internship in Education Fall or spring. 2–6 credits. S-U grades optional. Each student, before course enrollment, must obtain the approval of a faculty member who will assume responsibility for supervising work.
Staff.
An opportunity for practical experience in educational professions development.

602 Proseminar in Organization and Management of Sponsored Research Fall and spring. 2 credits each term. S-U grades optional. Prerequisite: permission of instructor.
F 2:30–4. J. A. Dunn.

Designed for doctoral students, advanced graduate students, and practitioners in the field who have responsibility for the promotion, management, or supervision of educational research, development, or evaluation projects. The seminar is devoted to an in-depth review of the history of educational research, patterns of federal support, the federal procurement process, and proposal preparation. Successful and unsuccessful proposals are analyzed. Attention is given to alternative strategies for proposal development.

606 Seminar in Science and Environmental Education Fall or spring. 1 credit.
T 7:30–9:30 p.m. V. N. Rockcastle.
Coordinates various interest groups in science and environmental education. Discussions center around curriculum development, research and thesis writing, and current problems.

611 Seminar in Educational Psychology and Curriculum Spring. 3 credits. S-U grades optional. Prerequisite: permission of instructor. Offered alternate years.
Hours to be arranged. R. E. Ripple.
Selected aspects of the relationship between curriculum and the psychology of education. Emphasis is on the psychology of human learning and implications for structuring learning experiences and curriculum development. Appropriate for graduate students in educational psychology, curriculum, and instruction and others with interests in the relationship between psychology and curriculum.

615 Seminar in Applied Behavioral Science Fall. Variable credit. S-U grades.
W 1:25–3:30. D. E. Hedlund.
Selected topics in adult counseling, human relations training, and applied educational psychology.

618 Adult Learning and Development Spring. 3 credits. S-U grades optional. Prerequisite: permission of instructor. Offered alternate years.
Hours to be arranged. R. E. Ripple.
Deals with adult development and learning behavior from points of view of educational psychology, social psychology, and sociology. Inferences are drawn from theory and research to the practice of adult continuing education. Appropriate for graduate students in educational psychology, extension and continuing education, community service education, and others interested in adult learning and development.

619 Conceptual Problems in Educational Inquiry Fall. 3 credits. S-U grades optional. Prerequisite: experience or course work in research.
R 12:20–2:20. D. B. Gowin.
Techniques and procedures for the critical appraisal of research documents. Practice in such appraisal is required, with primary emphasis on conceptual structures rather than research techniques. Students may use their own research proposals or research products as material for analysis.

624 Designing Extension and Continuing Education Programs Fall. 3 credits. Prerequisite: permission of instructor.
T 1:25–4. Staff.
Designed to help students understand current theories, concepts, principles, and procedures central to the process of developing programs and curricula for the continuing education of adults. Emphasis is on such key problems as conceptualization of the nature and role of programming, situation analysis and needs identification, choosing among alternative courses of action, stating program objectives, macroplanning and microplanning, and program organization.

627 Behavioral Change in International Rural Modernization Spring. 3 credits.
J. L. Compton.
An exploration of the social psychological aspects of socioeconomic development, focusing on the theoretical orientations of individual modernity, values-beliefs-motives, achievement motivation, entrepreneurship, innovativeness, expectancies, and self-efficacy and the applied orientations of communication-diffusion of innovation-adoption behavior, nonformal education, community development, planned change, and change agentry. For students with interests or experience in international rural or community development.

628 Community Education Fall. 3 credits.
W 2:30–5. J. L. Compton.
An examination of the concept of community, changes in community life, the analysis of community, alternative strategies for community development, patterns of response to community by such public institutions as community colleges, cooperative extension, social work, and community schools, and such functional dimensions of community education programming as participatory decision making, paraprofessionals, volunteers, leadership development, council formation and function, interagency coordination, and change agent roles. For students with interest or experience in education or development programs where community is an important concern.

630 Special Problems in Agricultural and Occupational Education Fall and spring. 1–3 credits. S-U grades optional. May also be offered in Summer Session.
Hours to be arranged. Staff.
The course provides an opportunity for graduate-level study of individually selected problems and issues in agricultural and occupational education. Designed for experienced teachers.

632 (532) Teaching Agricultural and Occupational Education Spring. 3 credits. Prerequisite: an introductory course in teaching methods or permission of instructor.
T 2:30–5. A. L. Berkey.
The focus of the course is on the selection, use, and evaluation of methods and materials for teaching occupational subjects. Methods for both group and laboratory instruction are covered. Opportunity is provided through use of modules for students to develop teaching competencies based on their individual needs and interests. Development of self-evaluation skills is included. A class project on the selection or development of instructional materials is required.

633 (533) Curriculum in Agricultural and Occupational Education Fall. 3 credits.
M 1:25–3:30, labs to be arranged. W. E. Drake.
Current situations affecting occupational education curricula are examined. Principles, objectives, and sources of information are developed for planning curricula. Strategies for developing occupational courses are examined. Consideration is given to planning, developing, and managing work experience programs. Participants have an opportunity to observe ongoing programs at the secondary and two-year-college levels and pursue individual interests in curriculum improvement.

634 (534) Adult Education Programs: Organization and Direction Fall. 3 credits.
F 1:25–4:20. H. R. Cushman.
Alternative procedural models for organizing and conducting adult occupational education courses are presented. Guidelines and procedures for implementing the models in secondary and postsecondary school settings are emphasized.

635 Teacher Preparation in Agriculture
Fall. 3 credits. Prerequisite: teaching experience in agriculture.
W 1:25–3:20. A. L. Berkey.
For persons with teaching experience interested in the preparation of occupational teachers. Involvement in the Cornell program of teacher preparation in agriculture is expected.

636 Occupational Education Program: Administration and Supervision Spring. 3 credits.
W 2:30–4:25; special sessions to be arranged.
J. P. Bail.
Practices and procedures of organizing, administering, and supervising programs of occupational education at the secondary and postsecondary level are stressed. The role of the director in providing leadership in improving instruction, designing programs, and using resources at federal, state, and local levels is considered.

639 Evaluating Programs in Occupational Education Spring. 3 credits.
T 1:25–3:20; labs to be arranged. W. E. Drake.
This course examines objectives, criteria, and strategies for evaluating programs of occupational education in secondary and postsecondary schools. Evaluation models, case studies, and evaluation as a function of program planning are considered. Participants examine the roles of supervision in evaluation and have an opportunity to develop and apply evaluative instruments. Field trips and resource persons provide opportunities to observe actual evaluation problems and procedures.

645 Seminar in Curriculum Theory and Research Spring. 3 credits. Prerequisite: Education 445 or 545 or permission of instructor.
Hours to be arranged. G. J. Posner.
Theoretical issues in curriculum and appropriate areas for curriculum research are discussed.

669 Studies in Educational Administration Spring. 3 credits. S-U grades optional.
W 3:35–6. E. J. Haller.
An analysis and critique of current research in educational administration. Discussion of research priorities and strategies in the conceptual area of educational governance. For graduate students interested in conduct of research on problems of educational governance.

673 Seminar in Dewey's Philosophy of Education Fall. 3 credits. S-U grades optional. Prerequisite: work in philosophy and permission of instructor.
R 3–5. D. B. Gowin.
A detailed analysis of some selected major Dewey works *(Democracy and Education, Experience and Education, Art as Experience)*. One objective of the seminar is to help students learn how to read Dewey and to compare and apply his ideas about education to current problems and issues.

711 Seminar in Educational Psychology Fall. 3 credits. S-U grades optional. Prerequisite: permission of instructor before first meeting.
W 4:30–6:30. M. D. Glock.
The seminar has varied emphasis from year to year, focusing on theoretical issues in the teaching, measurement, and evaluation of reading.

716 Seminar in Educational Research and Evaluation Fall. 3 credits. S-U grades only. Prerequisite: permission of instructor.
Hours to be arranged. J. Millman.
An intensive study of the literature in a particular area of research methodology. Topics in recent years have included procedures and issues in educational evaluation, the interface of instruction and measurement, and the design of educational experiments. Current topic to be announced.

730 Seminar in Agricultural and Occupational Education Spring. 2 credits. S-U grades optional.
R 2:30–4:25. H. R. Cushman.
For master's degree candidates who have had teaching experience and doctoral candidates with majors or minors in agricultural and occupational

education. Emphasis is on current problems and research and includes discussion of student research proposals.

771 Seminar in the Sociology of Education Fall. 3 credits. S-U grades optional.
Hours to be arranged. E. J. Haller.
Intensive study of a selected topic in the sociology of education, with consideration of its organizational and policy implications.

772 Seminar in Philosophy of Education Spring. 3 credits. S-U grades optional. Prerequisite: permission of instructor.
Hours to be arranged. K. A. Strike.
Topics to be announced.

800 (700) Master's Level Thesis Research Fall or spring. Credit arranged. S-U grades optional. Each registration must be approved by a faculty member who will assume responsibility for guiding the work.
Staff.
Limited to students working on theses or other research and development projects.

900 (800) Doctoral Level Thesis Research Fall or spring. Credit to be arranged. S-U grades optional. Each student, before course enrollment, must obtain the approval of a faculty member who will assume responsibility for guiding the work.
Staff.
Limited to students working on theses or other research and development projects.

Related Course in Another Department

Historical Roots of Modern Psychology (Psychology 490)

Entomology

E. H. Smith, chairman; W. L. Brown, Jr., E. W. Cupp, J. E. Dewey, G. C. Eickwort, P. P. Feeny, J. G. Franclemont, emeritus, G. G. Gyrisco, H. H. Hagedorn, R. G. Helgesen, W. T. Johnson, J. P. Kramer, R. A. Morse, A. A. Muka, L. L. Pechuman, B. L. Peckarsky, D. Pimentel, E. M. Raffensperger, R. B. Root, A. Sawyer, E. T. Schmidtmann, M. Semel, M. J. Tauber, W. M. Tingey, C. F. Wilkinson, R. G. Young

Courses by Subject

Apiculture: 260, 262, 264
Behavior: 662
Ecology: 370, 460, 471, 664, 672, 695
Introductory courses: 200, 212
Medical entomology and pathology: 452, 453
Morphology: 322
Pest management: 241, 340, 342, 443, 677
Physiology, biochemistry and toxicology: 483, 687, 690
Taxonomy and acarology: 331, 621, 631, 632, 633, 634

200 Insects and Man Fall. 2 credits. S-U grades optional.
Lec, T R 11:15. E. M. Raffensperger.
A presentation of the insects, with attention to their roles in nature and in civilization. Biological, historical, social, economic, and cultural aspects are discussed. Intended for students in all colleges.

212 Insect Biology Fall. 3 credits. Prerequisite: Biological Sciences 101–102 (may be taken concurrently) or equivalent.
Lec, W F 11:15; lab, M T W R or F 2–4:25.
G. C. Eickwort.
Introduces the science of entomology by focusing on basic principles of systematics, morphology, physiology, behavior, and ecology of insects. The lab in early fall includes field trips to collect and study insects in the natural environment. A small collection stressing ecological categories is required.

241 Applied Entomology Spring. 3 credits. Prerequisite: Biological Sciences 101–102 or equivalent.
Lec, T R 10:10; lab, M T W R or F 2–4:25.
E. M. Raffensperger.
A compendium of the insects associated with crops and farm animals. Discussions of insect pest management requirements on farm and garden, along with descriptions of control methods, materials, and equipment.

260 Introductory Beekeeping Spring. 2 credits.
T R 11:15. R. A. Morse.
Introduces the fundamentals of beekeeping, including the life history, instincts, and general behavior of honey bees. Attention is given to the biology of the honey bee. Some lectures are devoted to pollination of agricultural crops and the production of honey and beeswax.

262 Biology of the Honey Bee Fall. 1 credit. Limited to 10 students. Prerequisite: permission of instructor.
15 laboratories in September and October only, hours to be arranged. R. A. Morse.
A lab and field course in which the classical experiments by von Frisch on vision, chemical senses, and language of the honey bee are repeated. Labs include demonstration of sex attractant, swarm orientation, the natural nest, and a study of wasp, bumble bee, and other social insect nests.

264 Practical Beekeeping Spring. 1 credit. Limited to 20 students. Prerequisite: Entomology 260 (may be taken concurrently).
Lab, R or F 2–4:30. R. A. Morse.
Fourteen labs to acquaint students with practical methods of colony management. Labs involve actual work with package bees and mature colonies. Three labs are concerned with apple pollination and methods of moving colonies into orchards.

322 Insect Morphology Fall. 5 credits. Prerequisite: Entomology 212 or 241. Offered alternate years.
Lec, M W F 10:10; lab, M F or T R 1:25–4:25.
G. C. Eickwort.
An introduction to the external and internal anatomy of insects, with emphasis on the comparative and functional aspects. The lab is devoted largely to dissection.

331 Introductory Insect Taxonomy Spring. 3 credits. Prerequisite: Entomology 212.
Lec, R 10:10; lab, T R 2–4:25. W. L. Brown.
An introduction to the systematics and distribution of insects. Lab practice in the identification of orders, families, and representative genera of insects; methods of collection and preparation of insect specimens. Field trips are taken in the late spring.

340 Insect Pest Management Spring. 4 credits. Prerequisites: Entomology 212 or 241, and Entomology 400 or Biological Sciences 360, or permission of instructor.
Lec, M W F 9:05; lab, M 1:25–4. R. G. Helgesen.
A lecture and lab introduction to principles and techniques of insect pest management as these relate to the diverse problems in contemporary economic entomology.

342 Special Topics in Economic Entomology
Hours to be arranged. Entomology faculty.
Topics to be arranged.

370 Pesticides in the Environment Fall. 2 credits. Prerequisites: Biological Sciences 101–102 or equivalent.
Lec, T R 10:10. R. J. Kuhr.
A survey of the different types of pesticides, their uses, their distribution in the environment, and their effects on various components of the environment. For students whose main emphasis is not in pesticide usage.

408 Undergraduate Research Fall or spring. Credit to be arranged. Prerequisite: permission of instructor. Undergraduates must attach to their course enrollment material written permission from the staff member who will supervise the work.
Entomology faculty.

443 Pathology and Entomology of Trees and Shrubs (also Plant Pathology 443)
See Plant Pathology 443 for course description.

418 Special Topics for Undergraduates Fall or spring. Credit to be arranged. Prerequisite: permission of instructor. Undergraduates must attach to their course enrollment material written permission from the staff member who will supervise the work.
Entomology faculty.

452 Medical Entomology Fall. 3 credits. Prerequisites: either Entomology 212 and Veterinary Medicine 330 or permission of instructor.
Lec, M W 9:05; lab, F 8–11. E. W. Cupp.
A survey of arthropods of public health and veterinary importance, with emphasis on transmission dynamics of pathogens, the bionomics of vector populations, and current control concepts. Morphology and taxonomy of selected groups are examined in the laboratory, with additional exercises in vector-pathogen relationships and epidemiological techniques.

453 Insect Pathology Spring. 4 credits. Prerequisites: Entomology 212 or equivalent, a course in microbiology, or permission of instructor.
Lec, M W 10:10; lab, R 1:25–4:25. J. P. Kramer.
A survey of the diseases of insects caused by viruses, bacteria, fungi, and protozoans and a consideration of the role of microbial diseases in natural and applied insect control. Lab investigations center around living insect–pathogen associations and the consequences of these associations for both insect and microbe.

460 Insect Ecology (also Biological Sciences 460) Fall. 4 credits. Prerequisites: Entomology 212 and Biological Sciences 360 or equivalents.
Lec, W F 11:15; lab to be arranged. R. B. Root.
Familiarity with ecological principles is assumed; emphasis is on integrating these concepts through detailed analysis of the life systems and adaptive strategies of terrestrial insects. Includes field methods, natural histories, contrast between natural and managed systems, and population dynamics.

471 Bionomics of Freshwater Invertebrates
Spring. 4 credits. Prerequisite: Entomology 212. Biological Sciences 360 recommended.
Lec, T R 9:05; lab, M F or T R 1:25–4:25.
B. L. Peckarsky.
A field and lab study of aquatic insects and other macroscopic freshwater invertebrates, including conditions for life in streams, ponds, and other freshwater habitats, identification of macroscopic invertebrates (especially aquatic insects) found there, life histories, methods of collection, trophic interactions, and other ecological relationships.

483 Insect Physiology Spring. 4 credits. Prerequisite: Entomology 212 and a course in biochemistry.
Lec, M W F 11:15; lab, W or F 1:25.
H. H. Hagedorn.
An introduction to insect physiology, with emphasis on development and organ systems.

[618 Techniques of Biological Literature Fall. 2 credits. Offered alternate years. Not offered 1979–80.
Lec, T R 9:05. J. G. Franclemont.

The history of the development of entomological literature and a critical study of the biologists' works of reference. Practice in the use of indexes and use and preparation of bibliographies.]

[621 Acarology Fall. 4 credits. Offered alternate years. Prerequisites: Entomology 212 and permission of instructor. Not offered 1979–80.
Lec, M F 10:10; lab, M F 1:25–4:25.
G. C. Eickwort.
An introduction to the taxonomy, morphology, and bionomics of mites and ticks, with emphasis on taxa of economic importance. A collection is required.]

631 Taxonomy of the Smaller Orders of Insects Fall. 3 credits. Prerequisite: Entomology 331. Offered alternate years.
Disc, F 10:10; lab, F 2–4:25 and 1 other by arrangement. W. L. Brown.
Discussions of the classification, evolution, and bionomics of the orders and families of insects, excluding the larger orders of Holometabola. Lab studies on the literature and on the characters and classification of representative genera and species. Continuation of taxonomy of Holometabola is in Entomology 632, 633, and 634.

[632 Taxonomy of the Immature Stages of Holometabola Fall. 3 credits. Prerequisite: Entomology 631 or permission of instructor. Offered alternate years. Not offered 1979–80.
Lec, W 10:10; lab, W F 2–4:25. Staff.
Lectures on structure and habits of insect larvae. Lab studies of the literature, comparative morphology, and identification of the immature stages of the Holometabola.]

[633 Taxonomy of the Coleoptera and Lepidoptera Spring. 3 credits. Prerequisite: Entomology 331. Offered alternate years. Not offered in 1979–80.
Lec, W 10:10; lab, W F 2–4:25. Staff.
Lab studies on the literature and on the characteristics and classification of representative genera and species of these orders.]

634 Taxonomy of the Diptera and Hymenoptera Spring. 3 credits. Prerequisite: Entomology 331. Offered alternate years.
Lec, W 10:10; lab, W F 2–4:25, and 1 other by arrangement. W. L. Brown.
Lab studies on the literature and on the characters and classification of representative genera and species of these orders.

662 Insect Behavior Seminar Spring. 1 credit. Prerequisites: permission of instructors and either Entomology 212 and Biological Sciences 321 or equivalents.
Hours to be arranged. G. C. Eickwort, M. J. Tauber.

[664 Seminar in Coevolution Between Insects and Plants Spring. 2 credits. S-U grades optional. Limited to 15 students. Prerequisites: entomology, ecology, evolution, organic chemistry, and written permission of instructor. Offered alternate years. Not offered 1979–80.
Hours (one evening a week) to be arranged.
P. P. Feeny.
For graduate students and seniors. Presentations and discussions by students on the evolution of patterns of interaction between plants and insects, emphasizing critical evaluation of concepts and evidence.]

672 Seminar in Aquatic Ecology Fall. 1 credit. Prerequisites: permission of instructor and either Entomology 471 or Biological Sciences 462. Offered alternate years.
Hours to be arranged. B. L. Peckarsky.
Discussion and analysis of current concepts and problems in limnology and aquatic entomology, including the critical study of selected reference works and research papers.

677 Biological Control Fall. 3 credits. Prerequisites: Entomology 212, Biological Sciences 360, and permission of instructor.
Lec, T R 9:05; lab, T 2–4:25. M. J. Tauber.
Theory and method of biological control of arthropod pests and weeds. Lab includes studies with living parasites and predators.

687 Insect Biochemistry Fall. 2 credits. Prerequisite: permission of instructor. Offered alternate years.
Hours to be arranged. R. G. Young.
Primarily a lab course, emphasizing some comparative aspects of biochemistry. Lectures provide basis for the lab.

[690 Insect Toxicology and Insecticidal Chemistry Spring. 4 credits. Prerequisites: general chemistry and organic chemistry. Undergraduate students by permission of instructor. Offered alternate years. Not offered 1979–80.
Lec, M W F 9:05; lab, day to be arranged, 1:25–4:25. C. F. Wilkinson.
The chemistry of insecticides and their metabolism and mode of action in insects and mammals.]

707 Special Topics for Graduate Students Fall or spring. Credit to be arranged. Prerequisite: permission of instructor.
Entomology faculty.

708 Graduate Research Fall or spring. Credit to be arranged. Prerequisite: permission of instructor.
Entomology faculty.

709 Teaching Entomology Credit to be arranged.
Entomology faculty.
Teaching entomology or for extension training.

Jugatae Seminar Fall and spring.
M 4–5.
A seminar conducted by Jugatae, the entomology club of Cornell University, to discuss topics of interest to its members and guests.

Floriculture and Ornamental Horticulture

C. F. Gortzig, chairman; A. Bing, J. W. Boodley, A. M. Elliot, C. C. Fischer, R. T. Fox, G. L. Good, R. J. Lambert, R. W. Langhans, A. S. Lieberman, R. G. Mower, A. M. Petrovic, E. F. Schaufler, J. G. Seeley, H. B. Tukey, Jr.

100 Introductory Floriculture and Ornamental Horticulture Fall. 3 credits. S-U grades optional for students not specializing in floriculture and ornamental horticulture. Principally for freshmen. Field trip costs about $25 plus room and meals.
Lec, M W 8; lab, T or W 2–4:25. J. W. Boodley.
An introduction to basic plant physiology and plant processes, control of the plant environment, and the industry and opportunities. A required weekend field trip to visit commercial enterprises is made.

105 Floral Design Fall or spring. 2 credits. Each lab limited to 22 students. Preference given to department majors. Lab charge, $25 for materials that the student keeps.
Lec-lab, T W or R 1:25–4:25. C. C. Fischer.
A study of the principles of flower arrangement, the care of plant materials, and the factors affecting keeping quality. The established design techniques of this country are presented with emphasis on the economical use of supplies.

401–411 Physiology of Horticultural Plants Fall. 401 (lec), 2 credits; 411 (lab), 1 credit. Prerequisite: Biological Sciences 242 or 342 or permission of instructor. Lab limited to 40 students.
Lec, T R 8; lab, R 1:25–4:25. H. B. Tukey, Jr.
Application of physiology to germination of seeds, rooting of cuttings, manipulation of bulbs, and propagation of plants by budding and grafting. Stress on basic mechanisms concerning initiation and development of roots and shoots.

402 Physiology of Horticultural Plants Spring. 4 credits. Prerequisite: Biological Sciences 242 or 342 or permission of instructor.
Lec, M W F 8; lab to be arranged. Staff.
A study of the physiology of growth and development of horticultural plants in response to their environment.

450 Special Topics on Ornamental Plants Fall or spring. Credit to be arranged. Limited to 15 students. Primarily for upperclass floriculture and ornamental horticulture majors. Prerequisites: Floriculture 213, 312, or 313 or the equivalent, and permission of instructor.
Hours to be arranged. R. G. Mower.
Topical subjects in plant materials. Independent and group study of important groups of woody and herbaceous plant materials not considered in other courses. The topic is given in the supplementary announcement.

451 Special Problems in Floriculture and Ornamental Horticulture 1 or more credits. S-U grades optional. Prerequisite: students must satisfy the staff member under whom the work is to be taken that their background warrants their choice of problems. Undergraduates must attach to their course enrollment material written permission from the staff member who will supervise the work and assign the grade.
C. F. Gortzig and staff.
Work on problems under investigation by the department or of special interest to the student.

600 Seminar Fall or spring. S-U grades only. For department staff and graduate students.
R 12:10.

Related Courses in Other Departments

General Horticulture (Vegetable Crops 103)

Introduction to Landscape Design (Landscape Architecture 140)

Commercial Floriculture

325 Flower-Store Management Fall. 3 credits. Prerequisites: Floriculture 105 and permission of instructor. Lab materials charge, $25. Cost for field trips, $15 plus room and meals.
Lec, 2 hours to be arranged; lab, F 1:25–4:25.
R. T. Fox.
Lectures devoted to flower-shop management, business methods, merchandising, and marketing of floricultural commodities. Labs include the application of subject matter and the principles of commercial floral arrangement and design. Required field trips made to flower shows and to wholesale and retail florist establishments.

424 Principles of Florist Crop Production Spring. 4 credits. Prerequisites: Floriculture 401 and Biological Sciences 242, 342 (may be taken concurrently), or equivalent; or permission of instructor. Limited to 40 students, with 20 per lab section. Preference given to juniors. Cost for field trips, $20 plus meals.
Lec, M W F 9:05; lab, M or R 2–4:25. J. G. Seeley.
Commercial production of florist crops. Emphasis on principles of culture of ornamental plants as influenced by greenhouse environment. Field trips are made to commercial greenhouses.

425 Greenhouse Production Management Spring. 4 credits. Prerequisite: an elementary course in horticulture or equivalent. Primarily for seniors. Cost for field trips, $100.
Lec, T R 10:10–12:05. R. W. Langhans.
Intended to provide the latest information on efficient

operation and administration of a commercial greenhouse, outside the sphere of production methods for specific crops. Consideration is given to the industry, centers of production, competition, location, types of structures, heating, ventilation, cooling, fertilizing, and watering systems, and business analysis and management. Two field trips are taken.

Nursery and Turfgrass Crop Management

314 Turfgrass Management Spring. 3 credits. Prerequisite: Agronomy 200 or permission of instructor.
Lec, T R 10:10; lab, R 2–4:25. A. M. Petrovic.
The scientific principles, practices, and materials for the construction and maintenance of lawn, sports, and utility turfgrass areas. Environmental effects on growth are also studied.

317 Nursery Crop Production and Maintenance Fall. 4 credits. Prerequisite: Floriculture 401.
Lec, M W F 9; lab, M 12:20–2:15, 2:30–4:25. G. L. Good.
Problems of commercial propagation and growth of nursery plants to marketable stage. Digging, storing and packaging of nursery stock included. Some consideration is given to the planting and culture of landscape plants. Field trips are included in lab work.

318 Advanced Turfgrass Management Fall. 2 credits. Prerequisites: Floriculture 314 or equivalent, and permission of instructor. Cost of field trip, $10 plus room and meals.
A. M. Petrovic.
A continuation of Floriculture 314, with emphasis on applying scientific principles to management of golf courses, athletic fields, parks, industrial grounds, and sod production. A weekend inspection trip is taken to experimental test plots and special turfgrass areas.

Plant Materials

213 Woody Plant Materials Spring. 4 credits.
Lec T R 9:05; lab T 1:30–4:30, W or F 2–4:25 or two sections to be arranged. R. G. Mower.
A study of the trees, shrubs, and vines used in landscape plantings. Emphasis is on winter identification and their values for use as landscape material.

248 Taxonomy of Cultivated Plants (also Biological Sciences 248) Spring. 4 credits.
Lec, M W 10:10; lab, M W 2–4:25. J. W. Ingram, Jr.
A study of ferns and seed plants, their relationships, and their classification into families and genera, emphasizing cultivated plants. Emphasis is on gaining proficiency in identifying and distinguishing families and to preparing and using analytical keys; attention is also given to the economic importance of taxa, to the basic taxonomic literature, and to the elements of nomenclature.

312 Garden and Interior Plants I Fall. 3 credits.
Lec T R 10:10; lab T 1:30–4:30. R. G. Mower.
A study of ornamental plants used in garden and interior situations. The first 7 weeks cover primarily herbaceous annuals and perennials, with the lab devoted to various practical gardening activities. The remainder of the semester covers the major kinds of foliage and flowering plants used in the home and other interior landscape situations. Emphasis is on identification, use, and general cultural requirements.

313 Woody Plant Materials for Landscape Use Fall. 3 credits. Limited to 30 students. Primarily for landscape architecture majors.
Lec, W 10:10; lab, F 9:05–12:05. R. G. Mower.
A study of the trees, shrubs, vines, and ground covers used in landscape plantings in the northeastern United States. Emphasis is on leaf identification and on characteristics that determine their usefulness as landscape subjects. Opportunity for independent study is provided.

322 Garden and Interior Plants II Spring. 3 credits. Prerequisite: Floriculture 312 or permission of instructor.
Lec M W 11:15; lab M 1:30–4:30 or two sections to be arranged. R. G. Mower.
A continuation of Floriculture 312. The first 7 weeks are devoted to a further study of interior plants, with emphasis on specialized groups of interior plants as orchids, cacti and succulents, gesneriads, ferns, palms, and bromeliads. The second 7 weeks are devoted to outdoor herbaceous plants such as tulips, daffodils, crocus, iris, as well as other spring-blooming bulbs and perennial plants. Outdoor laboratories emphasize practical gardening activities appropriate to the spring season.

Freehand Drawing and Illustration

109 Drawing for Landscape Architects Fall. 3 credits. Primarily for department majors; others admitted with permission of instructor. Limited to 25 students.
Lec, R 10:10; studio, T 9:05–11, R 1:25–4:25. A. Elliot.
Emphasizes the development of a graphic language and an approach to freehand perspective. Outside sketchbook assignments.

111 Freehand Drawing Fall or spring. 3 credits. Credit may not be received for both Floriculture 109 and 111. S-U grades optional. Sections limited to 25 students. Prerequisite: permission of instructor.
Fall: M W F 10:10–12:05. R. J. Lambert. Spring: lec, T or W 10:10; 5 additional studio hours a week scheduled in 2- or 3-hour periods during M T W R F 9:05–12:05, T 2–4:25. A. Elliot.
Objective is to develop accuracy of observation and skill in delineation. Practice is given in outdoor sketching and still-life and figure drawing. Principles of freehand perspective are taught and applied. Outside sketchbook assignments.

210 Perspective for Landscape Architects Spring. 3 credits. Primarily for department majors.
T R 1:25–4:25. R. J. Lambert.
Practice in perspective construction from plans and elevations, rendering techniques, and basic design principles. Outside sketchbook assignments.

211 Freehand Drawing and Illustration Fall. 2 credits. Prerequisite: Floriculture 111 or equivalent. S-U grades optional.
6 studio hours scheduled in two- or three-hour units between 9:05 and 12:05 M T W R F. R. J. Lambert.
Progression to the organization of complete illustrations. Subject matter largely from sketchbooks, still life, and imagination. Composition, perspective, and ways of rendering in different media are considered.

214 Watercolor Spring. 2 credits. Prerequisite: Floriculture 111 or equivalent. S-U grades optional.
6 studio hours scheduled in two- or three-hour units between 9:05 and 12:05 M T W R F.
R. J. Lambert.
A survey of watercolor techniques. Subject matter largely still life, sketchbook, and on-the-spot outdoor painting.

316 Advanced Drawing Fall or spring. 2 credits. S-U grades optional. Prerequisite: Floriculture 211 or permission of instructor.
6 hours to be arranged. A. Elliot, R. J. Lambert.
For students who want to attain proficiency in a particular type of illustration or technique.

417 Scientific Illustration Fall. 2 credits. Prerequisite: Floriculture 211 or 316 or equivalent. S-U grades optional for graduate students only.
6 studio hours scheduled between 9:05 and 12:05 M T W R. A. Elliot.
A survey of methods of illustration. Training in techniques of accurate representation in media suitable for reproduction processes, including pen and ink, scratchboard, wash, and mixed media.

Landscape Architecture

See page 26.

Food Science

J. E. Kinsella, chairman; R. C. Baker, D. K. Bandler, D. H. Beermann, H. F. DeGraff, T. W. Downes, D. C. Graham, R. B. Gravani, L. F. Hood, W. K. Jordan, F. V. Kosikowski, R. A. Ledford, F. W. Liu, R. P. March, D. D. Miller, N. N. Potter, J. M. Regenstein, G. E. Rehkugler, J. W. Sherbon, W. F. Shipe, Jr., J. R. Stouffer, G. H. Wellington, R. R. Zall

100 Introductory Food Science Fall. 3 credits.
M W F 10:10. N. N. Potter.
A comprehensive introduction to food science and technology — its scope, principles, and practices. Topics are: constituent properties, methods of preservation, the major food groups including their handling and processing, and current problems such as chemical additives and world feeding needs. Interrelationships between chemical and physical properties, processing, nutrition, and food quality are stressed.

150 Food Facts and Fads Spring. 2 credits. S-U grades optional.
Lec, M 7:30 p.m.; disc, W 7:30–9:25 p.m., R 12:20–2:15 or 2:30–4:25 or F 8–9:55 (sections during even-numbered weeks of the term only).
W. F. Shipe, staff, and invited speakers.
A series of public lectures dealing with current topics relating to foods. Attempts are made to dispel misconceptions about foods and the factors affecting them. Lectures are open to students and the public. Discussions deal with lecture material and assigned readings.

200 People and Their Food Spring. 2 credits.
Lec and disc, R 2:30–4:25. H. F. DeGraff.
The dynamics of food and population balances in both the developed and less-developed world regions and the world's growing dependence on science to provide adequate food.

210 Food Analysis Spring. 3 credits. Prerequisite: Chemistry 104 or 208.
Lec, W F 12:20; lab, R or F 1:25–4:25.
J. W. Sherbon.
Designed to acquaint the student with chemical tests used by food analysts. Emphasis is on understanding and use of good analytical techniques, including gravimetric, volumetric, and spectrophotometric methods. Procedures for screening, routine quality control, and official tests for fats, proteins, carbohydrates, and selected minor nutrients are introduced.

220 Food Science for Industry Fall. 2 credits.
Lec and lab, F 12:20–4:25. R. C. Baker.
Provides understanding of food industry operations. Half the labs are production of food products (sausages, pastries, etc.) by students and half are visits to commercial plants producing those products. One or two longer field trips may be offered.

247 Postharvest Food Systems Fall. 2 credits. S-U grades optional. Prerequisite: freshman chemistry. Food Science 100 recommended.
T R 10:10. M. C. Bourne.
This interdisciplinary course describes various courses of postharvest food losses in developing countries and methods available to reduce the losses. Designed for all students in agriculture. Emphasis on cereal grains. Biology and control of rodents, birds, insects, and molds in stored foods, chemical causes of quality loss, simple drying and storage practices, effects of climate. Economic and social factors affecting food preservation and storage technology are discussed.

300 Physical Chemistry of Foods I Fall. 3 credits. Prerequisite: Mathematics 111 or equivalent. Not open to graduate students.
Lec, M W 11:15; disc, F 12:30–2:15 or 2:30–4:15. J. W. Sherbon (odd years), J. M. Regenstein (even years).
An introduction ot the principles of molecular structure, energetics, and kinetics is offered, with applications of these principles to food systems and similar biological materials. Topics include thermodynamics, properties of solutions, phase equilibria, reaction mechanisms, and transport phenomena.

301 Nutritional Aspects of Raw and Processed Foods Spring. 3 credits. Prerequisite: Nutritional Sciences 115 or permission of instructor.
M W F 9:05. D. Miller.
A nutritional evaluation of foods available in the United States. Topics include food labeling, food consumption patterns, criteria for the nutritional evaluation of foods, nutrient composition of foods, effects of agricultural practices on nutritional quality, effects of commercial processing on nutrients (including brief descriptions of food-processing methods), the nutrient composition and nutritional role of fabricated foods, the nutritional value of fast foods, nutrification of foods, and food additives.

302 Introduction to Food Engineering Fall. 4 credits. Prerequisites: Food Science 100 and physics.
Lec, M W F 10:10; lab, M 1:25–4:25. W. K. Jordan.
Engineering aspects of dairy and food plant operations.

304 Food Sanitation As Related to Public Health Spring. 3 credits. Prerequisite: Food Science 100.
Lec, T R 10:10; lab, R 1:25. R. R. Zall.
Deals with the sanitary principles and control measures essential in producing and processing wholesome and safe foods. Rules and regulations of the U.S. Public Health Service, the Food and Drug Administration, the U.S. Department of Agriculture, and other organizations important to the food industry are covered.

311 Milk and Frozen Desserts Fall. 2 credits. Prerequisite: Food Science 100 or equivalent or permission of instructor. Offered alternate years.
Lec, W 12:20; lab, W 1:25. W. K. Jordan, R. R. Zall.
Deals with the principles and practices of processing fluid milk products and frozen desserts. The chemical, microbiological, and technological aspects of processing these dairy products are considered. Field trips to processing plants supplement the lectures and lab work.

351 Milk Quality Spring. 1 credit. Prerequisite: Animal Science 350 (may be taken concurrently) or permission of instructor.
Lec, F 12:20. D. K. Bandler, R. R. Zall.
Aspects of farm sanitation and milk handling as they apply to milk quality. Quality control tests, farm bacteriology, cleaning, and sanitizing. Special problems of marketing fresh and manufactured dairy products.

394 Food Microbiology Lectures Spring. 2 credits. Prerequisites: Microbiology 290 and 291.
M W 12:20. R. A. Ledford.
The major families of microorganisms of importance in foods are studied systematically, with emphasis on the roles of these organisms in food preservation, food fermentations, and public health.

395 Food Microbiology Laboratory Spring. 2 credits. Graduate students must have permission of the instructor.
M W 2–4:25. R. A. Ledford.
Work includes study of the physiological characteristics of representative food microorganisms, practice in using general and special methods for microbiological testing and control of food products, and practice in isolating and characterizing organisms of importance in foods.

400 Undergraduate Research in Food Science Fall or spring. 2 credits. S-U grades optional. Students must attach to their course enrollment material written permission from the staff member who will supervise the work and assign the grade. Except for students enrolled in the honors program, credit will be limited to 4 credits.
Hours to be arranged. Staff.
Independent study.

401 Concepts of Product Development Spring. 2 credits. S-U grades optional. Prerequisite: Food Science 100 or equivalent. Offered alternate years.
M W 10:10. L. F. Hood.
A discussion of the sequence of events involved in developing and marketing new food products. Topics include packaging and labeling, food additive and ingredient regulations, taste panels, market testing, market research, and patents.

402 Product Development Laboratory Spring. 2 credits. S-U grades optional. Limited to food science majors. Prerequisite: concurrent registration in Food Science 401 and permission of instructor. Offered alternate years.
Lab, W F 1:25–4:25. L. F. Hood.
Emphasis is on gaining practical experience in the development of new foods.

[403 International Food Science and Development Fall. 3 credits. Offered alternate years. Not offered 1979–80.
Lec, T R 11:15; disc, R 1:25–4:25. F. V. Kosikowski.
Characteristics of the development, processing, and marketing of staple and exotic foods throughout the world. Expanding protein resources for people in critical areas, pollution control, and diseases related to food are considered. Organization, operations, and contributions of United Nations, technical agencies, governments, and nongovernment organizations are discussed.]

404 Food Processing I — Drying, Freezing, Heat Preservation Spring. 3 credits. Offered alternate years.
Lec, T R 11:15; lab, T 1:25–4:25. N. N. Potter.
Deals with the principles and practices of drying, freezing, canning, and other heat treatments applied to foods. Current processing methods and their relations to the chemistry, microbiology, and technology of the ingredients and final products are discussed.

[405 Food Processing II — Concentrating, Separating, Mixing Spring. 3 credits. Prerequisites: 302 and Microbiology 290 and 291. Offered alternate years. Not offered 1979–80.
Lec, T R 11:15; lab, T 1:25–4:25. W. K. Jordan, R. R. Zall.
Deals with the principles and practices of evaporation, reverse osmosis, homogenization, size reduction, waste management, and other unit operations important to the food industry.]

406 Food Processing III Lecture — Fermentations Fall. 3 credits. Prerequisite: background in microbiology. Offered alternate years.
Lec, T R 11:15; disc, R 1:25–4:25. F. V. Kosikowski.
A presentation of the principles and practices of fermentations leading to important foods from plant, animal, and single-cell protein sources. Included are wine and malt beverages, cheese, petroprotein, and vegetable foods.

[407 Food Processing IV — Fats and Oils Fall. 3 credits. Offered in even years. Not offered 1979–80. Open to upperclass and graduate students.
Lec, W F 9:05; lab, F 1:25–4:25. J. E. Kinsella.
Sources, composition, and properties of edible fats and oils are discussed. Effects of lipids on food quality and storage stability and factors affecting chemical and physical stability of food fats are described. Chemical technology of emulsions, shortenings, edible oils, margarine, and butter is taught.]

408 Food Processing III Demonstration — Fermentations Fall. 2 credits. Prerequisite: concurrent registration in Food Science 406. Enrollment limited. Offered alternate years.
Lab, T 1:25–4:25. F. V. Kosikowski.
Lab demonstrations in food-processing fermentations.

409 Food Chemistry Fall. 3 credits. Prerequisite: organic chemistry or biochemistry.
Lec, T R 8–9:25. W. F. Shipe, L. F. Hood, J. E. Kinsella, J. M. Regenstein.
Deals with the relationship between the chemical composition and properties of foods. Attention is given to the interactions among the components of food.

410 Sensory and Objective Evaluations of Foods Spring. 3 credits. Prerequisite: statistics.
Lec, M W F 11:15. W. F. Shipe.
Deals with the sensory techniques used in evaluating the flavor, color, and texture of foods and the effects of these properties on consumer acceptance. Objective methods for measuring these qualities and appropriate statistical methods for analyzing the subjective and objective results and establishing a quality-control program.

411 Food Mycology Fall. 3 credits. Offered alternate years. Prerequisite: Microbiology 290 or 291 or equivalent. Microbiology 394 recommended.
Lec, T R 10:10; lab F 1:25–4:25. D. C. Graham.
To acquaint students with important fungi, from the standpoint of their beneficial as well as their harmful effects in food production, preservation, and spoilage. Labs deal with morphology, culture and isolation, identification of fungi, and isolation and quantification of fungal toxins.

413 Function of Food Ingredients Spring. 1 credit. S-U grades optional. Prerequisite: Food Science 409. Offered alternate years.
Lec, F 10:10. L. F. Hood.
Intended for food science majors anticipating product development, production, or quality-control assignments in the food industry. Functional properties of classes of ingredients and their potential interactions with other food constituents are discussed. Guest lecturers from ingredient suppliers participate.

415 Principles of Food Packaging Fall. 3 credits.
Lec, M W F 9:05. T. W. Downes.
Intended primarily for students in food science and related fields. The basic properties of some packaging materials and systems are discussed and applied to specific packaging systems for meats, dairy products, fruits and vegetables, fats and oils, etc.

450 Special Topics in Food Science Fall or spring. 3 credits maximum. S-U grades optional. Prerequisite: permission of instructor.
Staff.
For the food science student. May include individual tutorial study, a special lecture topic selected by a professor or a group of students, or selected lectures of a course already offered. As topics may be changed, the course may be repeated for credit.

600 Seminar Fall or spring. 1 credit. S-U grades only. Limited to graduate students; required of all food science graduate students.

601 Food Protein Chemistry Fall. 3 credits. Limited to graduate students and to seniors with permission of the instructor. Prerequisite: Food Science 300 or its equivalent. Students who have already had Biological Sciences 631 may not take

this course for credit. Offered alternate years.
Lec, M W F 10:10. J. M. Regenstein.
The chemistry and physical chemistry of proteins are discussed. Important proteins of food systems are examined in terms of methodology currently used in protein chemistry for characterization and purification. Interactions of proteins with other food components are also covered.

602 Food Lipids Spring. 2 credits. Limited to graduate students. Offered alternate years.
T R 12:20. J. E. Kinsella.
Disposition of lipid materials in foods and how lipids influence the chemical and physical attributes of various foods. Effects of storage, heating, refrigeration, and enzymes on food lipids and the chemical mechanisms of oxidation. Importance of lipids to food flavors.

603 Food Carbohydrates Spring. 2 credits. Limited to qualified seniors and graduate students. Prerequisite: Biological Sciences 330 or equivalent. Offered alternate years.
Lec, T R 10:10. L. F. Hood, R. S. Shallenberger.
A consideration of the chemistry of carbohydrates in foods including sugars, starches, pectins, gums, and cellulose. Emphasis is on their intrinsic chemistry, their origins in raw materials, and the subsequent changes occurring during processing and storage.

[604 Chemistry of Dairy Products Fall. 2 credits. Prerequisites: qualitative and quantitative analysis and organic chemistry. Offered alternate years. Not offered 1979–80.
Lec, T R 12:20. Staff.
A study of milk constituents and physical properties. Deals with milk enzymes, lactose, milk fat, milk proteins, and minor constituents and includes biological variations and processing effects.]

605 Application of Physical Chemistry to Foods Fall. 1 credit. Prerequisite: physical chemistry or concurrent registration in Food Science 300. Not open to students who have completed or are registered in Food Science 710.
Lec, F 11:15; disc, M 8 or 12:20. J. W. Sherbon (odd years), J. M. Regenstein (even years).
The application of physical chemical principles to important food systems, with emphasis on emulsions.

606 Instrumental Methods Fall. 5 credits. Prerequisite: permission of instructor.
Lec, M W F 8; lab, W or R 1:25–4:25.
J. W. Sherbon.
Deals with instrumental methods widely used in research and industry. The major emphasis is on chromatography, spectroscopy, electrophoresis, thermal analysis, and the use of computers. The stress is on the theoretical and practical aspects of the material presented.

608 Food Color and Food Pigments Fall. 1 credit. Prerequisite: organic chemistry. Offered alternate years.
Lec, F 12:20. J. P. VanBuren.
An introduction to theories of color perception and color spaces, followed by a survey of chemical and physical properties of the major food pigments and their stability during processing and storage. Color and pigments of selected commodities are examined.

609 Rheology Fall. 1 credit. Offered alternate years.
Lec, T 12:20. M. C. Bourne.
Fundamental concepts of rheology applied to foods, with emphasis on objective methods for measuring textural properties. Principles and practice involved in measuring texture, viscosity, texture profiling, and consistency; instrumentation and correlations between objective and sensory methods of texture measurements. Examples of rheological problems in each major food group.

[610 Introductory Chemical Toxicology Fall. 1 credit. Prerequisites: biochemistry and animal physiology. Offered alternate years. Not offered 1979–80.
Lec, F 11:15. G. S. Stoewsand.
An introduction to the concepts and essentials of toxicology, especially as related to foods; physiologically active compounds in natural and processed foods; antinutritive substances; intentional food additives; potential contaminants; safety evaluation and regulation of foods. Writing or a brief student lecture is assigned, to widen knowledge of current research.]

611 Toxicants and Their Analysis. Spring. 1 credit. Prerequisites: organic and analytical chemistry. Offered alternate years.
Lec, F 11:15. D. J. Lisk.
An introduction to the nature of the problem of pesticides and heavy metals in the environment. Methods for analyzing traces of such toxicants in biological materials are covered. Techniques such as extraction, isolation, and determination are discussed. Students should have had prior training in chromatographic methods.

[614 Mathematical Evaluation of Processed Packaged Foods Spring. 3 credits. Offered alternate years. Not offered 1979–80.
Lec and disc, R 2–4:25. T. W. Downes.
Mathematical methods used to evaluate the thermal processing of packaged foods are presented in depth. These techniques are used in predicting shelf life and nutrient loss.]

[615 Secondary Plant Metabolites in Foods Fall. 1 credit. Prerequisite: Biological Sciences 431 or 432. Offered alternate years. Not offered 1979–80.
Lec, F 12:20. G. Hrazdina.
Deals with the biochemistry of secondary plant metabolites (e.g., sulphur-containing compounds, alkaloids, flavonoids, terpenes) and their importance to food products. Emphasis is on the chemical properties of these compounds, their reactions, their occurrence in edible plants, and their influence on food products.]

710 Physical Chemistry of Foods II Fall. 3 credits. Prerequisite: Mathematics 111 or equivalent. Not open to students who have had physical chemistry or Food Science 300. Limited to graduate students.
Lec, M W F 11:15; disc, M 8 or 12:20.
J. W. Sherbon (odd years), J. M. Regenstein (even years).
The application of physical chemical principles to important systems, with emphasis on emulsions. In addition, an introduction to the principles of molecular structure, energetics, and kinetics is offered, with applications of these principles to understanding foods and other biological materials.

Related Courses in Other Departments

Marketing (Agricultural Economics 240)

Food Industry Management (Agricultural Economics 443)

Introduction to Agricultural Engineering and Computing (Agricultural Engineering 151)

Engineering Design and Analysis of Food Processing Equipment (Agricultural Engineering 466)

Meat and Meat Products (Animal Science 290)

Commercial Meat Processing (Animal Science 392)

Advanced General Microbiology Lectures (Microbiology 390)

Postharvest Handling and Marketing of Vegetables (Vegetable Crops 312)

International Agriculture

600 Seminar: International Agriculture Fall and spring. Noncredit. S-U grades only.
Third and fourth Wednesdays of each month, 4–5.
Staff.
The seminar focuses on developing an understanding of the nature and interrelatedness of agricultural development and the social sciences, plant and animal sciences, foods and nutrition, and natural resources.

[601 Agricultural Development in Southeast Asia Spring. 2 credits. S-U grades optional. Not offered 1979–80.
F. H. Golay, G. Levine.
Major aspects of agricultural development in Southeast Asia are considered from economic, social, and technological points of view.]

602 Special Studies of Problems of Agriculture in the Tropics Spring. 3 credits. Prerequisites: an international agriculture course and permission of instructors. Cost of field-study trip, $200 for lodging, meals, and personal expenses (transportation provided).
R 2:30–4:25. Staff.
Oriented to provide students an opportunity to observe agricultural development in a tropical environment and promote interdisciplinary exchange among staff and students. The two-week field-study trip during January to Latin American countries is followed by discussions and assignments dealing with problems in agriculture and livestock production in the context of social and economic conditions.

603 Administration of Agricultural and Rural Development (also Government 692 and B&PA NCE 514) Spring. 3 credits. S-U grades optional.
T 2:30–5:30. M. L. Barnett, M. J. Esman, J. F. Metz, Jr., N. T. Uphoff, L. W. Zuidema.
An intercollege course designed to provide graduate students a multidisciplinary perspective on the administration of agricultural and rural development activities in developing countries. The course is oriented to students trained in agricultural and social sciences who are likely to occupy administrative roles during their professional careers.

[604 Seminar on African Agriculture and Rural Development Fall. 2 credits. Not offered 1979–80.
M 1:25–3:20. Staff.
Strategies for increasing food production and raising rural incomes in Africa. Topics include cropping systems in Africa and the role of agricultural technology in increasing yields, improving livestock production, strategies for improving human nutrition, food storage and mechanization, rural employment projects, alternative rural development strategies, and experience with World Bank and other internationally funded rural development projects.]

703 Seminar for Special Projects in Agricultural and Rural Development Spring. 1 credit. Required for graduate students enrolled in the M.P.S. (Agr.) degree program and majoring in international agricultural and rural development; others with permission of the program director. S-U grades only.
Hours to be arranged. Staff.
The seminar provides students the opportunity to present their special projects. It also serves as a forum for discussion of current issues in low-income agricultural and rural development, with particular attention to interdisciplinary complexities.

Related Courses in Other Departments

Economics of Agricultural Geography (Agricultural Economics 150)

Agricultural Trade Policy (Agricultural Economics 430)

Economics of Agricultural Development (Agricultural Economics 464)

Food, Population, and Employment (Agricultural Economics 660–661)

Microeconomic Issues in Agricultural Development (Agricultural Economics 664)

Seminar on Latin American Agricultural Policy (Agricultural Economics 665)

Seminar in Agricultural Development (Agricultural Economics 666)

Seminar in the Economics of Agricultural Development (Agricultural Economics 668)

[Seminar on Agricultural Trade Policy (Agricultural Economics 730)]

Export Marketing (Agricultural Economics 743)

Geography and Appraisal of Soils of the Tropics (Agronomy 401)

Production of Tropical and Subtropical Crops (Agronomy 422)

[Management Systems for Tropical Soils (Agronomy 480)]

Livestock Production in Warm Climates (Animal Science 400)

Forages of the Tropics for Livestock Production (Animal Science 403)

Intercultural Communication (Communication Arts 601)

Communication in the Developing Nations (Communication Arts 624)

Comparative Mass Media (Communication Arts 626)

Designing Extension and Continuing Education Programs (Education 624)

Behavioral Change in International Rural Modernization (Education 627)

Postharvest Food Systems (Food Science 247)

International Food Science and Development (Food Science 403)

Regional Landscape Inventories and Information Systems: An International Perspective (Landscape Architecture 531)

Analysis and Use of Vegetation in Comprehensive Land Planning (Landscape Architecture 532)

National and International Food Economics (Nutritional Sciences 457)

International Nutrition Problems, Policy, and Programs (Nutritional Sciences 680)

Seminar in International Nutrition and Development Policy (Nutritional Sciences 695)

Special Topics in International Nutrition (Nutritional Sciences 699)

Plant Diseases in Tropical Agricultural Development (Plant Pathology 655)

Economic Fruits of the World (Pomology 208)

Rural Sociology and World Development Problems (Rural Sociology 105)

Rural Development and Cultural Change (Rural Sociology 355)

[Subsistence Agriculture in Transition (Rural Sociology 357)]

Contemporary Sociological Theories of Development (Rural Sociology 606)

Social Organization of Agriculture (Rural Sociology 650)

[Macrosocial Accounting (Rural Sociology 715)]

[Social Movements in Agrarian Society (Rural Sociology 723)]

[Applications of Sociology to Development Programs (Rural Sociology 751)]

Sociotechnical Aspects of Irrigation (Rural Sociology 754)

Landscape Architecture

M. I. Adleman, program coordinator; E. J. Carter, R. L. Dwelle, T. H. Johnson, A. S. Lieberman, L. J. Mirin, P. J. Trowbridge

The Landscape Architecture Program at Cornell is sponsored by the College of Agriculture and Life Sciences (in association with the Department of Floriculture and Ornamental Horticulture) and the College of Architecture, Art, and Planning. The program is accredited by the American Society of Landscape Architects and offers three professional program alternatives: a four-year undergraduate program leading to a Bachelor of Science degree with specialization in landscape architecture, a three-year graduate program, and a two-year graduate program. Both graduate programs lead to a Master of Landscape Architecture degree.

Landscape Architectural Design Studios

201 (231) Design I: Basic Landscape Architectural Design Fall. 5 credits. Limited to landscape architecture majors. Cost of drafting equipment (to be used throughout the 6-studio sequence) and supplies, about $200. Basic expenses for field trip, about $125.
Lec, M 12:20; studio, M W F 1:25–4:25.
T. H. Johnson.
An introduction to the principles of landscape architectural design. The course introduces graphics and drafting, two- and three-dimensional design, color abstraction, form, space and spatial sequence, uses of plant material, site inventory and analysis, and the site design process. This is the first course in a sequence of 6 studio courses required for specialization in landscape architecture. Participation in the program's 5-day field trip is required.

202 (232) Design II: Basic Landscape Architectural Design Spring. 5 credits. Prerequisite: Landscape Architecture 201. Cost of supplies, about $100.
Lec, F 9:05; studio, M W F 10:10–12:35.
M. I. Adleman.
A continuation of the exposure to basic problem solving and the design process, with emphasis on the development of site design and graphic skills. Projects deal with the organization of outdoor space and the siting of buildings as well as the interrelationships of vehicular and pedestrian circulation, parking, open space, earth form, and vegetation.

301 (331) Design III: Intermediate Landscape Architectural Design Fall. 5 credits. Prerequisite: Landscape Architecture 202. Cost of supplies, about $100. Basic expenses for field trip, about $125.
Lec, F 9:05; studio, M W F 10:10–12:35.
P. J. Trowbridge.
Application of planning and design techniques to a variety of environmental problems. Timely issues are investigated and site development problems at several scales and land-use intensities are examined. Participation in the program's 5-day field trip is required.

302 (332) Design IV: Intermediate Landscape Architectural Design Spring. 5 credits. Prerequisite: Landscape Architecture 301. Cost of supplies, about $100.
Lec, M 12:20; studio, M W F 1:25–4:25.
T. H. Johnson.
Design exercises focus on the synthesis of conceptual ideas into three-dimensional compositions. Ideas from synectics, organizational systems, activity systems, historic spaces, and sculptures are used to compose hard space, soft space, regional space, and total energy environments.

401 (431) Design V: Advanced Landscape Architectural Design Fall. 4 credits. Prerequisites: Landscape Architecture 302 and concurrent registration in Landscape Architecture 425. Cost of supplies, about $100. Basic expenses for 5-day field trip, about $125.
Studio, M W F 1:25–4:25. M. I. Adleman.
Project-planning studies emphasizing the planting design component of site development. Design problems focus on the functional uses and spatial interrelationships of plants in the landscape. Several field exercises deal with aspects of planting implementation normally specified by the landscape architect. A 2-day field trip is made to selected sources of nursery stock. Participation in the program's 5-day field trip is also required.

402 (432) Design VI: Advanced Landscape Architectural Design Spring. 5 credits. Prerequisite: Landscape Architecture 401. Cost of computer time, supplies, and reproductions about $100.
Lec, F 9:05; studio, M W F 10:10–12:35.
P. J. Trowbridge.
An application of inventory and analysis methods to timely problems in both urban and rural environments. Several documentation formats are investigated, including computer mapping techniques.

***501 (581) Graduate Landscape Architectural Design Studio** Fall. 5 credits.
L. J. Mirin and staff.

502 Graduate Landscape Architectural Design Studio Spring. 5 credits.
Lec T 12:20; studio, T R 1:30–4:25. T. H. Johnson.
Design exercises focusing on the synthesis of conceptual ideas into three-dimensional compositions. Ideas from synectics, organizational systems, activity systems, historic spaces, and sculptures are used to compose hard space, soft space, regional space, and total energy environments.

***601 (590) Graduate Landscape Architectural Design Studio** Fall. 5 credits.
Staff.

800 (889) Thesis Research and Preparation in Landscape Architecture Fall or spring. Credit to be arranged. Limited to M.L.A. degree candidates. Prerequisite: permission of graduate field members concerned.
Hours to be arranged. Staff.

*Offered through the College of Architecture, Art and Planning.

Landscape Materials and Construction

310 (242) Site Construction I Spring. 4 credits. Prerequisite: permission of instructor. Surveying recommended.
Lec, M W 9:05; studio, T R 9:05–11.
P. J. Trowbridge.
Lectures, short exercises, and projects dealing with land-form design and the preparation of grading plans, calculation of earthwork, and layout of circulation systems, parking, and site utility systems.

311 (341) Site Construction II Fall. 4 credits. Prerequisite: permission of instructor.
Lec, T R 1:25–2:15; studio, T R 2:30–4:25.
T. H. Johnson.
The nature of construction materials and methods of construction used by landscape architects to implement project design proposals. Course includes field trips, lab demonstrations, lectures, and studio work on models; details; and a construction documentation package for a design project.

Landscape History and Theory

220 (211) Principles of Landscape Architecture Fall. 2 credits.
Lec, M W 9:05. P. J. Trowbridge.
An introduction to the basic principles involved in inventory and analysis techniques as they relate to design implementation in the outdoor environment. Case studies depicting application of these principles at all scales of land planning and design are presented. American landscape history and basic design theory as applied to the practice of landscape architecture are emphasized.

221 (212) Principles of Landscape Architecture Fall. 1 credit. Prerequisite: concurrent registration in Landscape Architecture 220.
Hours to be arranged. P. J. Trowbridge and staff.
Discussion of 220 lecture material at greater depth. Seminar format. Paper required.

425 (491) Plants and Design Fall. 2 credits. Prerequisite: Floriculture 213 or 313. Landscape architecture majors must register concurrently in Landscape Architecture 401.
Lec, T R 9:05. M. I. Adleman.
A study of planting design principles relating to the functional uses and spatial interrelationships of plants in the manufactured environment. Site, horticultural, and maintenance determinants affecting the selection and use of plant materials, as well as planting specifications, cost estimates, and planting implementation processes are included.

***520 (481) Contemporary Issues in Landscape Architecture** Fall. 2 credits.
Lec T 11:15. L. J. Mirin.

***521 (585) History of Landscape Architecture I** Fall. 4 credits.
Lec, T R 11:15. L. J. Mirin.

522 (586) History of Landscape Architecture II Spring. 3 credits.
Lec, T R 11:15. L. J. Mirin.

622 Graduate Seminar in Landscape Architecture Spring. 2 credits. Prerequisite: Landscape Architecture 502 (may be taken concurrently).
T 12:20–1:15. T. H. Johnson.
A review of modern designers and their values within the contemporary landscape.

*Offered through the College of Architecture, Art, and Planning.

Landscape Planning

†431 Introduction to Parks and Recreation Fall. 2 credits.
F 10:10–12:30 or 2–4:25. E. J. Carter.
The course deals with the essence of the park: its history and tradition; environmental planning issues; park design and the recreation profession. The course includes lectures, discussions, reading assignments, field trips, papers, and at least one design sketch problem.

†432 Issues in Parks and Recreation Spring. 2 credits.
F 10:10–12:30 or 2–4:25. E. J. Carter.
The focus is on state-level recreation planning and programming, urban design and design relationships to environmental interpretation, the local park planning and design process, and new directions in the recreation profession. The instructor presents case studies on each topic. Students have assigned readings and prepare a midterm and final paper.

***530 (583) Urban Landscape Planning and Design** Spring. 3 credits.
L. J. Mirin.

531 (572) Regional Landscape Inventories and Information Systems: An International Perspective Fall. 3 credits. Prerequisites: basic courses in landscape architecture, ecology and systematics, and agronomy and permission of instructor. Primarily for graduate students and upperclass students in landscape architecture. Also open to students in architecture, city and regional planning, ecology, international studies, international agriculture, natural resources, and environmental horticulture.
Lec, M W F 10:10. A. S. Lieberman.
Reading-seminar course exploring major current methodologies, approaches, academic and research centers for landscape inventory and analysis, and supporting land-use and natural resource information systems. Case studies in regional landscape planning in North America, Europe, Australia, and the Middle East.

532 (573) Analysis and Use of Vegetation in Comprehensive Land Planning Spring. 3 credits. Prerequisites: basic courses in landscape architecture, ecology and systematics, and agronomy and permission of instructor. Primarily for graduate students and upperclass students in landscape architecture. Also open to students in architecture, city and regional planning, ecology, international studies, international agriculture, natural resources, and environmental horticulture.
Lec, M W F 9:05. A. S. Lieberman.
An exploration of vegetation analysis techniques and methods applied to comprehensive land-use planning, followed by consideration of the environmental uses of plants in regional landscape planning. The landscape functions of vegetation at the regional scale are addressed through review of case studies in North America, Europe, the Middle East, and Australia.

Landscape Industry

140 (102) Introduction to Landscape Design Fall or spring. 3 credits. Lecture.
M W F 9:05. R. L. Dwelle.
An introduction to landscape design as well as interrelated horticultural considerations associated with the built environment. Guest lecturers in landscape architecture, ornamental horticulture, and related fields are scheduled throughout the semester.

340 (201) Landscape Design for Nurserymen and Landscape Contractors Fall or spring. 3 credits. Limited to 15 students. Priority given to landscape horticulture majors. Prerequisite: Floriculture 213.

†Pending approval of the College of Agriculture and Life Science's Curriculum Committee.

Lec, M 12:20, studio M W 1:25–4:25. R. L. Dwelle.
Fundamentals of landscape design applied to residential and other small-scale site-planning projects. Work in the studio introduces basic design process, site design principles, construction materials, planting design, and graphics.

Independent Study

555 Independent Study in Landscape Architecture Fall or spring. 1–3 credits. May be repeated for credit. S-U grades optional. Limited to students in the Landscape Architecture Program with permission of the faculty member directing the study.
Staff.
Work on special topics by individuals or small groups.

***621 (690) Summer Internship Seminar** Fall. 2 credits.
Hours to be arranged. L. J. Mirin.
Primarily for landscape architecture graduate students.

***650 Fieldwork/Workshop in Landscape Architecture** Fall or spring. Credit to be arranged.
Hours to be arranged. Staff.

Related Courses in Other Departments

Woody Plant Materials (Floriculture 213)

Drawing for Landscape Architects (Floriculture 109)

Perspective for Landscape Architects (Floriculture 210)

Microbiology

R. P. Mortlock, chairman; E. A. Delwiche, N. C. Dondero, W. C. Ghiorse, E. P. Greenberg, C. M. Rehkugler, P. J. VanDemark

290 General Microbiology Lectures Fall or spring. 3 credits. Prerequisites: Biological Sciences 101–102 and Chemistry 104 or 208. Concurrent registration in Microbiology 291 recommended.
M W F 11:15. Fall, W. C. Ghiorse; spring, P. J. VanDemark.
A study of the basic principles and relationships in the field of microbiology, with fundamentals necessary to further work in the subject.

291 General Microbiology Laboratory Fall or spring. 2 credits. Prerequisite: Microbiology 290 (may be taken concurrently).
M W 2–4:25 or T R 8–10:30, 11:15–1:45, or 2–4:25. Fall, W. C. Ghiorse; spring, P. J. VanDemark.
A study of the basic principles and techniques of laboratory practice in microbiology and fundamentals necessary to further work in the subject.

292 General Microbiology Discussion Spring. 1 credit. S-U grades only. Prerequisite: Microbiology 290 (may be taken concurrently).
Hours to be arranged. P. J. VanDemark.
A series of discussion groups in specialized areas of microbiology to complement Microbiology 290.

304 Tissue Culture Techniques and Applications Fall. 2 credits. Prerequisites: Microbiology 290 and 291 or permission of instructor.
F 1:25–3:30; 3 lab exercises scheduled on a rotating basis, F 3:30–5:30. C. M. Rehkugler.
A series of lectures and demonstrations dealing with cell culture methods, especially those required to culture cells of plants and animals from different tissue orgins. The application of cell culture to the study of bacterial diseases, virus replication, and the production of biologicals are considered.

390 Advanced General Microbiology Lectures Fall. 2 credits. Prerequisites: Microbiology 290 and 291 and organic chemistry. May be taken independently of Microbiology 391 and in sequence with or independently of Microbiology 392. Offered alternate years.
M W 11:15. E. A. Delwiche, N. C. Dondero.
A consideration of the morphological, taxonomic, cultural, and physiological characteristics of important groups of heterotrophic microorganisms. Included will be (1) spore-forming bacteria, propionic acid bacteria, and gram-negative cocci and (2) pseudomonads, enterics, and related forms.

391 Advanced General Microbiology Laboratory Fall. 2 credits. Limited to 20 students. Prerequisite: Microbiology 390 (may be taken concurrently). Offered alternate years.
M W 2–4:25. E. A. Delwiche, N. C. Dondero.
Intended as a lab complement to Microbiology 390. The isolation, characterization, and study of the groups of heterotrophic microorganisms included in Microbiology 390.

[392 Advanced General Microbiology Lectures Fall. 2 credits. Prerequisites: Microbiology 290 and 291 and organic chemistry. May be taken independently of Microbiology 393 and in sequence with or independently of Microbiology 390. Offered alternate years. Not offered 1979–80.
M W 11:15. P. J. VanDemark, E. P. Greenberg.
A consideration of the morphological, taxonomic, cultural, and physiological characteristics of important groups of heterotrophic microorganisms. Included are (1) the lactic acid bacteria and (2) the staphylococcus-micrococcus group and related gram-positive cocci.]

[393 Advanced General Microbiology Laboratory Fall. 2 credits. Limited to 20 students. Prerequisite: Microbiology 392 (may be taken concurrently). Offered alternate years. Not offered 1979–80.
M W 2–4:25. P. J. VanDemark, E. P. Greenberg.
Intended as a lab complement to Microbiology 392. The isolation, characterization, and study of the groups of heterotrophic microorganisms included in Microbiology 392.]

396 Applied and Industrial Microbiology Fall. 3 credits. Prerequisites: Microbiology 290 and organic chemistry.
T R 10:10–11:25. E. A. Delwiche, N. C. Dondero, and staff.
A survey of the microbiology of industrial fermentations and public health aspects of water and wastewater.

412 Aquatic Microbiology Spring. 3 credits. Prerequisites: Microbiology 290 or Agronomy 406, and organic chemistry.
T R 10:10–11:25. N. C. Dondero.
A consideration of the relation of microorganisms, especially the bacteria, to aquatic environments, both natural and artificial. The microbiology of wastewaters is included. Attention is given to fundamental biological concepts and to applied aspects of the occurrence and activities of microorganisms in water.

490 Microbial Physiology Lectures Spring. 3 credits. S-U grades optional. Prerequisites: Microbiology 290 and 291 and biochemistry.
M W F 11:15. R. P. Mortlock.
The concern is with the physiological functions of microorganisms. Particular consideration is given to the dynamics of growth, the nutrition and energy metabolism of developing cultures, and the interactions of the physical and chemical environments with the growth process. Composition and structure of microorganisms, metabolism, and various microbial processes such as transport and regulation are discussed.

491 Microbial Physiology Laboratory Spring. 3 credits. S-U grades optional. Limited to 12 students. Prerequisites: Microbiology 490 (may be taken concurrently) and permission of instructor.
T R 12:20–4:25. R. P. Mortlock.
The lab component of Microbiology 490. Experiments designed by the instructor and students to explore fundamental concepts, techniques, and instrumentation in microbial physiology.

492 Microbial Ecology Spring. 3 credits. Prerequisite: an elementary course in some facet of microbiology. Offered alternate years.
M W F 10:10. M. Alexander.
An introduction to the basic principles of microbial ecology. Attention is given to the behavior, activity, and interrelationships of bacteria, fungi, algae, and protozoa in natural ecosystems.

494 Cytology of Prokaryotes Lectures Spring. 3 credits. S-U grades optional. Prerequisites: Microbiology 290 and 291, biochemistry. Offered alternate years.
M W F 9:05. W. C. Ghiorse.
An in-depth survey of structure, function, and life cycles of prokaryotic organisms. Form, organization, and function within the prokaryotic domain are considered with respect to aggregates of cells, individual cells, sub-cellular organelles, and macromolecular architecture.

495 Cytology of Prokaryotes Laboratory Spring. 1 credit. Prerequisite: concurrent registration in Microbiology 494 and permission of instructor. Enrollment limited. Offered alternate years.
Hours to be arranged. W. C. Ghiorse.
Cytological techniques, including preparations for light and electron microscopy, which are especially applicable to the study of prokaryotic cells.

496 Selected Topics in Microbial Metabolism Spring. 2 credits. S-U grades optional. Prerequisites: beginning courses in general microbiology, biochemistry, and organic chemistry. Primarily for upperclass and graduate students.
T R 11:15. E. A. Delwiche.
Selected topics pertaining to the energy metabolism, oxidative and fermentative abilities, and biosynthetic capacities of microorganisms. Where possible and appropriate, the subject matter compares the various microbial forms.

499 Research in Microbiology Fall or spring. Variable credit. Undergraduates must attach to their course enrollment material written permission of the staff member who will supervise the work and assign the grade. The course cannot be used to fulfill the specialization requirement.
Hours to be arranged. Staff.

691 Graduate Seminar in Microbiology Fall and spring. 1 credit each semester. All graduate students majoring in microbiology must enroll each semester.
Hours to be arranged. Staff.

694 Bacterial Diversity Spring. 4 credits. Prerequisites: Microbiology 390 and 392 or Microbiology 490, and Biological Sciences 330–331 or equivalent.
M W 12:20–4:25. E. P. Greenberg
Physiology, ecology, and morphology of selected groups of bacteria, including the methanogenic bacteria, spirochetes, nitrogen-fixing bacteria, photosynthetic bacteria, thermophilic bacteria, myxobacteria, and others. Behavior of bacteria in response to environmental stimuli.

699 Microbiology Seminar Fall and spring. Required of all graduate students majoring in microbiology and open to all who are interested.
Hours to be arranged. Staff.

Related Courses in Other Departments

Soil Microbiology Lectures (Agronomy 406)

Advanced Soil Microbiology (Agronomy 606)

Insect Pathology (Entomology 453)

Food Microbiology Lectures (Food Science 394)

Food Microbiology Laboratory (Food Science 395)

Food Mycology (Food Science 411)

Basic Immunology Lectures (Veterinary Medicine 315)

Basic Immunology Laboratory (Veterinary Medicine 316)

Pathogenic Microbiology (Veterinary Medicine 317)

Microbial Genetics, Lectures (Biological Sciences 485)

Microbial Genetics, Laboratory (Biological Sciences 486)

[Advanced Immunology Lectures (Veterinary Medicine 705)]

[Advanced Immunology Laboratory (Veterinary Medicine 706)]

Advanced Work in Bacteriology, Virology, or Immunology (Veterinary Medicine 707)

Advanced Animal Virology Lectures (Veterinary Medicine 708)

Advanced Animal Virology Laboratory (Veterinary Medicine 709)

Immunopathology and Clinical Immunology (Veterinary Medicine 712)

Natural Resources

W. H. Everhart, chairman; R. A. Baer, H. B. Brumsted, J. W. Caslick, S. P. Gloss, R. J. Gutiérrez, L. S. Hamilton, E. E. Hardy, J. W. Kelley, J. P. Lassoie, R. J. McNeil, R. A. Malecki, A. N. Moen, R. R. Morrow, Jr., J. G. Nickum, R. T. Oglesby, M. E. Richmond, C. L. Schofield, D. A. Webster, B. T. Wilkins, W. D. Youngs

110 Ecological Basis for Conservation Spring. 2 credits.
Lec, T R 10:10 or 12:20. R. J. McNeil.
Ecological principles as applied to human use of environment, especially its living components. Survival strategies of animals and the application of these concepts to human beings. Ecological succession, carrying capacity, limiting factors, population dynamics, animal behavior, disease, and effects of contaminants on living organisms and systems are examples of environmental issues considered.

111 Ecological Basis Discussions Spring. 1 credit. Prerequisite: concurrent registration in Natural Resources 110.
Hours to be arranged. R. J. McNeil and staff.
Treatment of lecture material from Natural Resources 110 in greater depth and with varying emphasis, depending on the background and interests of the instructors and students.

201 Environmental Conservation Fall. 2 credits.
T R 10:10 or 12:20. R. J. McNeil.
People, natural resources, and environment. Our use

and misuse of the natural components of our environment. Current resource-use problems, including air and water pollution, radiation, garbage and waste, and the population explosion. An attempt is made to introduce the concept of a conservation ethic.

202 Environmental Conservation Discussions Fall. 1 credit. Prerequisite: concurrent registration in Natural Resources 201.
Hours to be arranged. R. J. McNeil and staff.
Treatment of lecture material from Natural Resources 201 in greater depth and with varying emphasis, depending on the background and interests of the instructors and students.

210 Introductory Field Biology Fall. 3 credits. Prerequisites: Either Biological Sciences 101 and 102 or equivalent. Preference given to natural resources sophomores. Expenses for field trip, no more than $6.
Lec, W 10:10; lab, M W 1:25–4:25. Overnight field trips. Staff.
Introduction to methods of inventorying, collecting, preserving, and identifying plants, animals and their habitats. Principles and concepts of systematics and ecology are studied as they apply to both aquatic and terrestrial systems. Selected aspects of current ecological thinking relevant to problems of resource management, particularly the assessment of the distribution and abundance of organisms, are stressed. Observation and recording of field observations are emphasized.

407 Religion, Ethics, and the Environment Spring. 3 credits. S-U grades optional. For juniors, seniors, and graduate students; others by permission. Limited enrollment.
T R 9:05; 1-hour disc to be arranged. R. A. Baer.
A study of the effects of Western religion and values on our understanding and treatment of nature. Historical overview, followed by consideration of selected themes, including progress, play and work, objectivity and subjectivity, human finitude and death, and knowledge as control. Also responsibility to future generations; limiting growth and questions of distributive justice; world population and global hunger; implications of environmental programs for minorities, the poor, and other nations; reverence for being.

430 Dynamics of Animal Populations Spring. 2 credits. For seniors and graduate students in natural resources; others by permission of instructor.
T R 10:10. W. D. Youngs.
A quantitative examination of the dynamics of animal populations. This course uses interactive computing to assist in analysis and understanding of mortality, growth, population estimation, and population interaction.

490 Practicum in Natural Resources Analysis and Management Fall. 5 credits. For seniors in natural resources; others by permission of instructors.
Hours to be arranged. Staff.
An in-depth exercise in planning the management of selected resources in a defined geographic area. Students work in groups under the supervision of a faculty committee with other faculty acting as consulting experts. Student groups make oral and written reports on their management plans to a client panel of faculty and outside evaluators.

500 Thesis Research and Professional Projects Fall and spring. Credit arranged. S-U grades only. Limited to graduate students working on thesis research or professional master's projects.
Staff.

610 Conservation Seminar Fall and spring. Noncredit. All graduate students in natural resources are expected to participate.
Time to be arranged. Staff.

611 Seminar in Environmental Values Fall. 3 credits. S-U grades optional. For graduate students; juniors and seniors by permission. Cost of weekend trip, no more than $12.
W 1:25–3:50. Weekend trip in late September. Extra class sessions for presentations of papers and projects. R. A. Baer.
How the humanities, particularly religion, philosophy, and ethics, contribute to our understanding of the environment. In successive years topics will include (1) the role of nonutilitarian values in our relationship to our natural environment, (2) land ethics, (3) new models for higher education in the age of ecology, and (4) concepts of growth and progress in Western culture and their impact on our treatment of the environment.

Fishery Biology

438 Fishery Resource Management Spring. 3 credits. Prerequisite: Natural Resources 440 or permission of instructor.
Lec, T R 8. W. H. Everhart.
Principles and problems in the management of freshwater and marine fishery resources, considered in relation to problems of human population and management of other natural resources.

440 Fishery Science Fall. 3 credits. Prerequisite: a year of statistics and calculus. For seniors majoring in fishery science; others by permission of instructor.
M W F 12:20. W. D. Youngs.
Principles and theories involved in dynamics of fish populations. Methods of obtaining and evaluating statistics of growth, population size, mortality, yield, and production are considered.

442 Techniques in Fishery Science Fall. 3 credits. Limited to 15 upperclass and graduate fishery students. Cost of field trips, no more than $30.
T R 1:25–4:25. 1 or more weekend field trips. D. A. Webster.
Emphasis is on methods of collecting fish and related data when information on population dynamics is of paramount importance. Labs include field experience in use of gear and instruments. Opportunities for additional experience in ongoing college fishery research program is provided.

443 Managing the Aquatic Environment Fall. 2 credits. Limited to 30 juniors and seniors not majoring in aquatic science.
Lec T R 10:10. Saturday field trip. R. T. Oglesby.
The nature of aquatic environments and effects of humans on them are initial foci. Wise use of aquatic resources is surveyed in terms of human impacts on them, including the introduction of toxicants and nutrients, removal or addition of particular biotic components, and modifications of the physical environment. Emphasis is on lakes, rivers, and estuaries.

444 Aquaculture Spring. 3 credits. Prerequisite: Biological Sciences 476 or permission of instructor. Cost of field trips, no more than $25 each.
Lec, T R 12:20; lab, R 1:25–4:25. 1 or more 2-day field trips. J. G. Nickum.
An introduction to the development, techniques, and uses of aquaculture. The biological bases, historical development, and current status of cultural practices for fishes and invertebrates throughout the world are considered. Lab consists of discussions, demonstrations, and field trips. Individual projects providing additional experience may be arranged.

494 Research in Fishery Science S-U grades optional. Credit to be arranged.
Hours to be arranged. J. L. Forney, S. P. Gloss, J. G. Nickum, R. T. Oglesby, C. L. Schofield, D. A. Webster, W. D. Youngs.

601 Seminar on Selected Topics in Fishery Biology Fall or spring. 1 credit.
Hours to be arranged. Staff.

605 Ecology and Management of Disturbed Aquatic Systems Spring. 3 credits. Limited to 20 seniors and graduate students. Prerequisite: limnology or oceanography.
Lec, T R 10:10; disc, W or F 1:25–3:25. R. T. Oglesby.
Lectures and readings are focused on responses of aquatic ecosystems to stress and on significance of such reactions. Methods and strategies of management to minimize undesirable aspects of human activities are considered. Detailed case histories are studied and discussed. There is at least one Saturday field exercise. Recommended for students specializing in the aquatic sciences.

609 Effects of Ecological Perturbations on Fishes Fall. 3 credits. Prerequisites: Biological Sciences 476 or permission of instructor. Cost of field trips no more than $15.
Lec, T R 9:05; lab W 1:25–4:25; several field trips. S. P. Gloss.
Impacts of habitat alteration and physical-chemical pollutants with emphasis on freshwater and diadromous fish species of North America. Direct and indirect effects of a variety of industrial and land-use practices on fish and other aquatic organisms with resultant changes in structure and function of fish communities due to lethal and sublethal responses are discussed. Laboratory includes several field trips.

Related Courses in Other Departments

Phycology (Biological Sciences 348)

Limnology (Biological Sciences 402)

Oceanography (Biological Sciences 461)

Biology of Fishes (Biological Sciences 476)

Ichthyology (Biological Sciences 479)

Marine Ecology (Biological Sciences 666)

Bionomics of Freshwater Invertebrates (Entomology 471)

Forestry

205 Maple Sirup Production Spring. 1 credit. S-U grades only. Limited to 20 students. Prerequisite: permission of instructor.
T 12:20–4:25 (4 preliminary seminars, followed by several half-days of fieldwork during the maple season). R. R. Morrow, A. Fontana.
Students work in most phases of the Arnot Forest maple operation and learn modern sap collecting techniques and quality control in making sirup. A 100-tap area is reserved for student installation of a tubing sap collection network.

302 Forest Ecology Fall. 3 credits. Limited to seniors and graduate students. Cost of trip, no more than $20.
Lec, M W 11:15; lab, M 1:30–4:30. 1 weekend trip, Sat. through Mon. L. S. Hamilton.
Understanding the wildland environment. Development of ability to identify and analyze what is present, what was present, what is likely to happen in various forest ecosystems. All lab sessions in the field. One required weekend trip to the Adirondacks or other major forest region.

303 Woodland Management Fall. 3 credits. S-U grades optional.
Lec, M W 11:15; lab, W 1:25–4:25 (1 field trip will end at 5:30). R. R. Morrow.
Designed to give the student the basic information necessary to permit sound woodland management decisions. Field trips to woodlots emphasize

variations in value and potential as well as biological growth. Introduction to tree identification, log scaling, timber estimating, tree marking, and stand improvement work. Planting, management, harvesting, marketing, and multiple use are discussed, as well as relationships of forestry to people and to the environment.

496 Research in Forestry S-U grades; letter grade by permission of instructor. Credit to be arranged.
Hours to be arranged. L. S. Hamilton, J. P. Lassoie, R. R. Morrow.

Resource Policy and Planning

300 Natural Resources Inventories Spring. 3 credits.
Lec, M W 12:20; lab, M T W 2. E. E. Hardy.
Procedures for inventorying resources, the methods used, and theories of inventory development in relation to present needs. Examination of the processes used in generating currently used inventories, application of methods to improve existing inventories, and experience in developing inventories are undertaken. Land resource inventories are emphasized.

498 Research in Resource Analysis and Planning Fall or spring. S-U grades optional. Prerequisite: permission of instructor.
R. A. Baer, H. B. Brumsted, L. S. Hamilton, E. E. Hardy, J. W. Kelley, R. J. McNeil, B. T. Wilkins.

602 Seminar in Natural Resource Analysis for Ecologically Based Planning Spring. 2 credits. S-U grades only.
W 2–4:30. L. S. Hamilton.
Multidisciplinary graduate seminar. Theme changes each year but usually involves a case study of a specific area of land and water. Fieldwork usually required. Engineers, economists, sociologists, soil scientists, foresters, planners, and wildlife and fishery biologists are invited to bring expertise to the planning table.

604 Seminar on Selected Topics in Natural Resources Conservation Fall. 1 credit. S-U grades only.
Hours to be arranged. Staff.
Primarily for graduate students majoring or minoring in natural resources conservation.

[606 Marine Resources Policies Spring. 2 credits. S-U grades optional. Prerequisites: at least one related course such as Biological Sciences 364, 666, or 668, Natural Resources 438 or 444, or permission of instructor. Offered alternate years. Not offered 1979–80.
R 1:30–3:30. B. T. Wilkins.
A seminar discussing the law and issues concerning current marine policy questions, such as coastal zone management, marine fish regulations, marine mammal protection, and wetland preservation.]

607 (510) Perspectives on Conservation Spring. 3 credits. S-U grades for graduate students. For graduate students; others by written permission of instructor. Offered alternate years.
R 1:25–3:30. B. T. Wilkins.
A seminar based on extensive readings of articles highlighting varying philosophical approaches to the conservation of natural resources. Views espoused by developmentalists, preservationists, naturalists, economists, and welfare economists are considered.

608 Policies and Management of Natural and Wild Lands Fall. 2 credits. S-U grades optional. Prerequisite: permission of instructor.
Lec, T 8–9:55. T. L. Hullar.
Lectures, discussions, special seminars, readings, and case studies on natural and wild lands, particularly those in public ownership. Major topics include the values of these lands, social and scientific basis for their establishment, analysis of the policies for preservation and use, and methods and strategies for management. National and state wilderness systems, social and biological carrying capacity, effects of special interests, and current issues are covered. An independent study of a selected area is required.

Related Courses in Other Departments

Resource Economics (Agricultural Economics 350)

Evaluating Resource Investment and Environmental Quality (Agricultural Economics 450)

Analysis and Interpretation of Aerial Photographs (Engineering CEE A687)

Physical Environment Evaluation (Engineering CEE A685)

Wildlife Science

304 Wildlife Ecology Spring. 4 credits. Limited to 25 students. Prerequisite: permission of instructor. Preference given to those with wildlife specializations. Cost of field trips, no more than $15 each.
Lec, M W 8; labs, W 1:25–4:25. A. N. Moen.
Consideration of the basic physical, physiological, interspecific, and intraspecific relationships of the organism and its environment. Electronic analyses of words and numbers are emphasized. Three weekend field trips may be required.

410 Principles of Wildlife Management Fall. 4 credits. Prerequisite: junior standing, Biological Sciences 360, or permission of instructor. Cost of field trips, no more than $6.
Lec, M W F 8; lab, F 1:25–4:25. Staff.
Fundamental characteristics and mechanisms of wildlife populations and habitats. Includes ecological, social, and economic aspects of wildlife management. Lab includes survey of economically important North American species as well as field trips illustrating methods of habitat management. One all-day Saturday and one overnight field trip are required. Students are also required to participate in a deer management project requiring additional fieldwork in late November.

411 Techniques in Wildlife Science Spring. 2 credits. Prerequisite: Natural Resources 410 or permission of instructor.
Lec, F 11:15; lab, F 1:25–4:25. J. W. Caslick.
An introduction to techniques used in wildlife research and management, with emphasis on field methods and northeastern game species.

414 Selected Topics in Wildlife Resource Policy Spring. 2 credits. S-U grades optional. Limited to seniors. Prerequisite: Natural Resources 410 or equivalent. Cost of field trips, no more than $30.
T 2–4:30. Several field trips. H. B. Brumsted.
A seminar devoted to analysis of selected current policy issues in wildlife management. Particular attention is given to citizen roles in policy development.

495 Research in Wildlife Science Fall or spring. S-U grades optional. Credit to be arranged. Prerequisite: permission of instructor.
Hours to be arranged. Staff.

600 Waterfowl Biology Fall. 3 credits. Prerequisite: permission of instructor.
Lec-lab, T R 1:25–3:50. Several field trips. R. A. Malecki.
An introduction to waterfowl and selected webless migrants. Emphasis is on the waterfowl resource in North America; identification of species, their ecological relationships, population dynamics, and management.

603 Habitat Ecology Spring. 1 or 2 credits. Limited to 12 seniors and graduates majoring in natural resources or biological sciences. Prerequisite: permission of instructor. Cost of field trips, no more than $10.
F 12:20. M. E. Richmond.
This course requires an understanding of broad ecological concepts relative to plant-wildlife interactions. The concept of habitat is addressed from the standpoint of island biogeography, and the interactions of habitat size, shape, location, degree of edge, and temporal change are explored. Major land forms and plant-animal communities of the northeastern United States will be visited during weekend field trips. Paper required.

Related Courses in Other Departments

Nature and Properties of Soils (Agronomy 200)

Ornithology (Biological Sciences 473)

Wildlife Pathology (Veterinary Medicine 636)

Plant Breeding and Biometry

R. L. Plaisted, chairman; R. E. Anderson, R. S. Chaleff, L. V. Crowder, H. L. Everett, V. E. Gracen, Jr., P. Gregory, C. C. Lowe, H. M. Munger, W. D. Pardee, O. H. Pearson, R. R. Seaney, M. E. Sorrells, D. R. Viands, D. H. Wallace

Biometry courses are listed under "Statistics and Biometry."

225 Plant Genetics Spring. 4 credits. Prerequisite: introductory biology.
Lec, M W F 11:15; lab, W R or F 1:25; lab section assignments at first lecture. L. V. Crowder.
An overview of genetic principles as related to plant sciences. Mendelian inheritance and cell mechanics, DNA as genetic material, genetic fine structure and gene regulation, gene recombination, linkage and mapping, gene interaction, extranuclear inheritance, environmental effect on phenotypic expression, gene mutation and chromosomal aberrations, variation in chromosome numbers, genes in populations, multiple gene inheritance, and genetic aspects of pest resistance. Relationship of genetic principles and concepts to plant breeding, plant improvement, and food production. Students conduct an independent inheritance project with *Brassica campestris*.

482 Plant Cell Genetics Spring. 2 credits. Prerequisites: Biological Sciences 281, Plant Breeding 225, or equivalent; and Biological Sciences 242 or equivalent.
T R 10:10. R. S. Chaleff.
General principles and techniques of plant cell and tissue culture and of their application in genetic studies of higher plants. Discussions of the culture of cells, protoplasts, microspores, and callus; the isolation and characterization of mutant clones; and the regeneration and genetic analysis of plants from such clones.

603 Methods of Plant Breeding Fall. 4 credits. Primarily for graduate students, but open to qualified seniors who expect to engage in plant breeding. Prerequisites: Biological Sciences 101–102, Biological Sciences 281 or Plant Breeding 225, or equivalent; and field crops, vegetable crops, floriculture, or pomology. Students must enroll in this course by August 1.
Lec, T R 8; lab, T R 1:25–4:15 (labs till 5 during first month). 2 Saturday field trips. H. L. Everett, L. V. Crowder.
Breeding systems for producing commercial crop varieties are considered in detail. Labs include selection techniques, screening for heritable variation, and controlling pollination. Special emphasis is on selection for disease resistance.

605 Physiological Genetics of Crop Plants Spring. 3 credits. Prerequisites: either genetics, biochemistry, and plant physiology, or permission of instructor.

T R 8–10. D. H. Wallace.

Both genetic and environmental influences on biochemical and molecular control of plant variation in physiological phenomena like photosynthesis, respiration, translocation, self-incompatibility, male sterility, yield, and heterosis are discussed. Emphasis is on variation that can be exploited in plant breeding, particularly in breeding for higher yield and adaptability.

608 Biochemical Analyses for Plant Breeders Fall. 3 credits. Limited enrollment. Prerequisite: permission of instructor. Students must enroll in this course by Aug. 27.

Lab, M W 1:25–5 (first 10 weeks). P. Gregory.

Acquaints the student with the specialized biochemical analyses commonly used in plant breeding programs. Nutrients and toxicants of several crops are studied. Each student is required to complete a special project. Emphasis is on developing an ability to critically assess biochemical analyses.

[612 Experimental Methods Spring. 2 credits. Prerequisite: 601 or permission of instructor. Offered alternate years.

M W F 12:20. C. C. Lowe.

The use of statistical methods and the application of experimental designs and plot techniques to problems in plant breeding and related agricultural research.]

622 Seminar Fall or spring. 1 credit. S-U grades only.

T 12:20. Staff and graduate students.

629 Special Topics in Plant Science Extension Spring. 2 credits.

F 1:25–4:25. W. D. Pardee.

Designed for graduate students and advanced undergraduates, to provide a broader knowledge of cooperative extension philosophy and methods, in order to prepare them for careers in extension and research or in related fields in public and commercial organizations. Topics relate to extension in other countries as well as in the United States.

650 Special Problems in Research and Teaching Fall, spring, or summer. 1 or more credits by arrangement with instructor. Undergraduates must attach to their course enrollment material written permission of the staff member who will supervise the work and assign the grade.

Staff.

716 Perspectives in Plant Breeding Strategies Spring. 2 credits. S-U grades optional. Prerequisite: Plant Breeding 603.

R 12:20–2:15. M. E. Sorrells.

Discussion of mating systems, selection techniques, and breeding strategies for self- and cross-pollinated crops. Extensive outside reading is required. Emphasis is on the discussion and evaluation of selected benchmark papers and current literature.

717 Quantitative Aspects of Plant Breeding Fall (begins eighth week of semester). 1 credit. S-U grades only. Prerequisites: Plant Breeding 603 and Statistics 601.

T R 9:05. R. L. Plaisted.

Discussion of random mating populations, inbreeding, and components of genetic variance.

718 Genetics and Breeding for Disease and Insect Resistance Fall (first 7 weeks of semester). 1 credit. S-U grades only. Prerequisite: Plant Breeding 603.

T R 10:10. V. E. Gracen.

Discussions of genetics and mechanisms of insect and disease resistance as they relate to the development and utilization of pest resistant varieties.

Plant Pathology

R. L. Millar, chairman; J. R. Aist, P. A. Arneson, S. V. Beer, C. W. Boothroyd, B. B. Brodie, R. S. Dickey, W. E. Fry, M. B. Harrison, R. K. Horst, G. W. Hudler, H. W. Israel, E. D. Jones, R. P. Korf, J. W. Lorbeer, W. F. Mai, W. F. Rochow, A. F. Sherf, W. A. Sinclair, R. W. Smiley, H. D. Thurston, H. D. VanEtten, R. E. Wilkinson, O. C. Yoder, M. Zaitlin, T. A. Zitter

300 Introductory Plant Pathology, Lectures Fall or spring. 2 credits. Prerequisite: Biological Sciences 101–102, 103–105, or 105–106.

Lec, T R 11:15. C. W. Boothroyd, W. A. Sinclair.

An introduction to the theory and practice of plant pathology, with emphasis on recognition of plant diseases, life cycles of causal agents, and control. Detailed attention is given to the interrelationship of pathogen, host plant, and environment and to specific aspects of the science, such as bacteria, fungi, mycoplasmas, nematodes, and viruses as pathogens; biological and chemical control; breeding for resistance; and disease forecasting.

301 Introductory Plant Pathology, Laboratory Fall or spring. 2 credits. Prerequisites: Biological Sciences 101–102, 103–104, or 105–106, and Plant Pathology 300 (may be taken concurrently). Limited to 100 students, 20 per section; preference given to juniors, seniors, and graduate students.

Lab, M T W R or F 2–4:25; conferences, as arranged. C. W. Boothroyd, W. A. Sinclair.

An opportunity to study fresh specimens of diseased field and forage crops, flowers, fruits, trees, shrubs, and vegetables and to participate in an autotutorial approach to diagnosis of disease, including isolation of plant pathogens, screening for nematodes, and inoculating with viruses.

302 Plant Disease Control Spring. 3 credits. Prerequisite: Plant Pathology 300–301 or equivalent.

Lec, T R 11:15; lab and rec, T W or R 1:25–4:25. P. A. Arneson.

This course complements Plant Pathology 300–301 with an in-depth presentation of the principles and practices of plant disease control, building on the students' knowledge of diseases and their causal agents. General principles and concepts, illustrated by specific examples, are presented. Students write a term paper applying these principles to a specific disease control problem. The labs provide practical experience in diagnosis and disease control techniques.

309 Introductory Mycology Fall. 4 credits. Prerequisites: a year of botany or equivalent and permission of instructor.

Lec, T R 1:25–2:15; lab, T R 2:30–4:25, an additional 2-hour period to be arranged. Required field trips. R. P. Korf.

An introduction to fungi, emphasizing biology and comparative morphology rather than taxonomy.

404 Pest Management for Plant Protection Fall. 4 credits. Limited to seniors and graduate students. Prerequisites — at least 2 of the following courses: Agronomy 315, Entomology 212, 241, and 340, and Plant Pathology 300–301 and 302. Ecology, economics, and statistics are recommended.

Lec, M W F 8; lab, M or W 1:25–4:25. P. A. Arneson.

This is the capstone course in the sequence for students specializing in plant protection. Its goal is to integrate the principles of pest control, economics, and ecology in the design and management of pest-crop systems.

431 Undergraduate Research in Mycology or Plant Pathology Fall or spring. 3–5 credits. S-U grades optional.

Not less than 3 labs, 3 hours each, per week. Staff.

An opportunity for undergraduates to test their research ability. The student is expected to pursue a problem under informal direction of the professor.

443 Pathology and Entomology of Trees and Shrubs (also Entomology 443) Spring. 5 credits. Prerequisites: either Plant Pathology 301 and Entomology 292 or equivalent.

Lec, M W F 10:10; lab, T or W 1:25–4:25, R or F 1:25–4:25. W. T. Johnson and W. A. Sinclair.

For students preparing for careers in horticulture, urban forestry, and pest management. Deals with the nature, diagnosis, assessment, and treatment of diseases and arthropod pests of trees and shrubs. Forest, shade, and ornamental plants are considered.

501 Advanced Plant Pathology Spring. 5 credits. S-U grades optional for students with a minor in plant pathology. Prerequisites: introductory plant pathology and permission of instructor.

Lec T R 11:15, an additional period to be arranged; lab, T R or W F 2–4:25. R. L. Millar.

Designed to acquaint the student with the basic principles and techniques of the science of phytopathology and to provide an adequate foundation for successful pursuit of research in this field.

502 Plant Disease Control and Epidemiology Fall. 3 credits. Limited to graduate students. Prerequisite: Plant Pathology 501 or equivalent.

Lec, T R 11:15; rec, T 1:25; lab, R 1:25–4:25. Several field trips are required. W. E. Fry.

Plant disease epidemiology is analyzed as the basis of disease management strategies. Techniques to identify the need for management practices are evaluated, and the utility of those techniques is evaluated on the basis of effects on epidemics. The impact of current research in epidemiology on disease management is assessed.

503 Diagnosis and Applied Pathology Summer and fall. 3 credits. S-U grades only. Limited to graduate students with a major or minor in plant pathology. Prerequisites: Plant Pathology 501 or equivalent and permission of coordinator.

Lec-lab, T R 1–4:30 during June, lec-discs, about twice a week, to be arranged, during balance of summer and September. 5 all-day field trips are required. S. V. Beer.

Provides instruction and experience in evaluating and diagnosing plant disease problems and provides an opportunity to observe diseases and research under field conditions. The effect of crop production practices on disease development is stressed. All important classes of pathogenic agents and commodities are considered.

[505 Plant Virology Fall. 3 credits. Primarily for graduate students with a major or minor in plant pathology; open to other graduate students. Prerequisite: Plant Pathology 501 or permission of instructor. Offered alternate years. Not offered 1979–80.

Lec-lab, T R 1:25–4:25. M. Zaitlin.

Basic information on plant viruses and on the diseases they cause. Emphasis is on viral replication mechanisms.]

506 Plant Nematology Spring. 3 credits. For graduate students with a major or minor in plant pathology; others by permission. Prerequisite: Plant Pathology 501 or permission of instructor. Offered alternate years.

2 lecs and a 3-hour lab each week. Hours to be arranged. W. F. Mai, M. B. Harrison.

Anatomy, morphology, and taxonomy of plant parasitic forms and nonparasitic soil-inhibiting forms of nematodes are studied. Plant pathogenic forms are also considered from the standpoint of host-pathogen relationships, host ranges, life cycles, and the symptoms they cause. Principles and methods of control are discussed.

[507 Bacterial Plant Pathogens Spring. 3 credits. For graduate students with a major or minor in plant pathology; others by permission. Prerequisite: Plant

Pathology 501 or permission of instructor. Offered alternate years. Not offered 1979–80.
Lec, T R 10:10; lab, W F 2–4:25. R. S. Dickey.
Basic information on bacterial plant diseases and phytopathogenic bacteria. The lab includes some of the more important techniques used in the study of bacterial plant pathogens.]

508 Disease Physiology Fall. 3 credits. For graduate students with a major or minor in plant pathology; others by permission. Prerequisites: Plant Pathology 501 or Biological Sciences 330 or 331, and permission of instructor. Offered alternate years.
Lec, W F 10:10; lab to be arranged. H. D. VanEtten and staff.
Designed to provide students with insight into the physiological bases for mechanisms of pathogenesis. Emphasis is on evaluating current literature.

531 Special Problems in Mycology or Plant Pathology Fall or spring. 3–5 credits. Limited to graduate students. Prerequisite: permission of instructor.
3 to 5 labs, 3 hours each, per week. Staff.
For work in mycology, modern techniques and experimental approaches are stressed. For work in plant pathology for minor thesis or problems, or for students wanting to develop familiarity with modern techniques in some phase of the science. For work in plant nematology, research projects in 5 areas are stressed.

[541 Philosophy of Plant Pathology Spring. 2 credits. S-U grades only. For Ph.D. students majoring in plant pathology. Prerequisites: Plant Pathology 501 and at least two other courses from Plant Pathology 502, 505, 506, 507 and 508, or permission of instructor. Offered alternate years. Not offered 1979–80.
Conferences, M W 8–10. D. F. Bateman.
A conference with advanced graduate students examining the concepts of plant pathology as they relate to basic and applied research problems, teaching, and extension.]

556 Advanced Plant Nematology Fall or spring. 3 credits. For graduate students only. Prerequisite: Plant Pathology 506.
Hours to be arranged. W. F. Mai.
Graduate students interested in plant nematology conduct four research projects in areas such as taxonomy, morphology, permanent mounting, soil and plant sampling procedures, procedures for extracting nematodes from soil and plant tissues, culturing, host-parasite relationships between nematodes and microorganisms, and evaluation of control practices. This research is intended to broaden training in plant nematology. The projects selected may not duplicate thesis research.

[579 Advanced Mycology Spring. 4 credits. Prerequisites: Plant Pathology 309 or equivalent, a course in genetics, and permission of instructor. Offered alternate years. Not offered 1979–80.
Lec, M 10:10; lab, M W 1:25–4:25, an additional 3-hour period to be arranged. Optional field trips. R. P. Korf.
A detailed study of the biology and taxonomy of the major groups of plant pathogenic fungi (rusts, smuts, Fungi Imperfecti, Peronosporales), with emphasis on mechanisms of variation of fungi.]

599 Taxonomy of Fungi Fall. 4 credits. Prerequisites: Plant Pathology 309 or equivalent, genetics, plant or animal taxonomy, and permission of instructor. Offered alternate years.
Lec, M W 10:10; lab, M W 1:25–4:25. Required field trips. R. P. Korf.
Emphasis is on the principles of taxonomy and nomenclature, critical evaluation of keys and monographs, and practice in identification. The Dicomycetes are treated in detail.

Unless otherwise indicated, the following description applies to courses 645–657.

Fall or spring. 1 credit. S-U grades only. Prerequisite: permission of instructor.
Hours to be arranged.
Weekly discussions of current topics in special areas of plant pathology and mycology. Students are required to do extensive reading of current literature and to present oral and written reports.

645 Plant Virology
W. F. Rochow, M. Zaitlin.

646 Plant Nematology
M. B. Harrison, W. F. Mai.

647 Bacterial Plant Diseases
R. S. Dickey.

648 Pathogen and Disease Physiology
H. D. VanEtten.

649 Mycology
R. P. Korf.
Fall, Agaricoles, Gasteromycetes; spring, Hemiascomycetes, Plectomycetes, Unitunicate Pyrenomycetes.

650 Diseases of Vegetable Crops Fall.
J. W. Lorbeer, R. E. Wilkinson.

651 Diseases of Fruit Crops
Autotutorial and discs. P. A. Arneson.
For graduate students and advanced undergraduates with a particular interest in fruit. Covers the economic importance, causal agents, symptoms, disease cycle, and control measures for the major diseases of fruit in the Northeast.

653 Dendropathology
G. W. Hudler, W. A. Sinclair.

654 Diseases of Florist Crops
R. K. Horst.

655 Plant Diseases in Tropical Agricultural Development Spring.
H. D. Thurston.

656 Cytology of Plant Diseases
J. R. Aist, H. W. Israel.

657 Plant Disease Epidemiology
W. E. Fry.

661 Plant Pathology Seminar Fall or spring. 1 credit. S-U grades only. Required of all plant pathology majors.
T 4:30–5:30. Staff.

671 Plant Pathology Colloquium Fall or spring. 1 credit.
First and third R of each month, 8–10 p.m. Staff and graduate students.

Related Courses in Other Departments

Special Studies of Problems of Agriculture in the Tropics (International Agriculture 602)

Topics in Ultrastructure of Plant Cells (Biological Sciences 642)

Pomology

W. J. Kender, chairman; G. D. Blanpied, L. L. Creasy, J. N. Cummins, D. C. Elfving, F. W. Liu, G. H. Oberly, R. M. Pool, L. E. Powell, J. P. Tomkins

101 Tree Fruits Fall. 3 credits. Prerequisite: introductory biology (may be taken concurrently). Cannot be taken for credit after Pomology 104.
Lec, T R 8; lab, M or W 2–4:25. G. H. Oberly.
A study of the general principles and practices of tree-fruit culture and their relation to the underlying sciences. Topics include propagation, varieties, orchard management, and growth and fruiting habits. Practical work is presented in grafting, pruning, site and soil selection, and planting.

104 Essentials of Fruit Growing Spring. 3 credits. Cannot be taken for credit after Pomology 101.
Lec, T R 8; lab, T or W 2–4:25. J. P. Tomkins.
Growing tree fruits, grapes, small fruits, and nuts in the Northeast. The student who wants a course in commercial aspects of fruit production should take Pomology 101.

208 Economic Fruits of the World Spring. 3 credits. Prerequisite: introductory biology, or permission of instructor. Offered alternate years.
Lec, M W 10:10; lab, F 2–4:25. F. W. Liu.
The more important subtropical and tropical fruits such as citrus, banana, pineapple, mango, coffee, and cacao are considered. Morphology, physiology, and adaptation to climate are stressed rather than details of culture. A broad view of world pomology is given.

302 Fruit Tree Nursery Operation Spring. 1 credit. S-U grades optional. Prerequisite: Pomology 101 or 104 or permission of instructor. Offered alternate years.
Lec, M W 9:05; lab, M 2–4:25. Meets first four and a half weeks of term. J. N. Cummins.
This course is intended to familiarize the fruit producer with the operations and problems of the fruit tree nursery operator. Topics include production objectives, management decisions, and cultural aspects of nursery operation. Techniques of grafting, budding, pest identification, inspection, and grading of fruit tree planting stocks are included.

304 Orchard Management I Spring. 3 credits. Prerequisite: Pomology 101 or 104.
Lec, M W 8; lab, R 1:25–4:25. D. C. Elfving and L. E. Powell.
A treatment of problems of concern to fruit growers such as site selection, planting and pruning systems, water relations, cold hardiness, dormancy, flowering, and fruiting. Physiological and practical aspects are emphasized.

305 Orchard Management II Fall. 3 credits. Prerequisite: Pomology 101 or 104. Pomology 304 recommended.
Lec, M W 8; lab, R 1:25–4:25. G. H. Oberly and L. L. Creasy.
A continuation of the principles of pomology presented in Pomology 304. Subjects include the later stages of fruit maturation, quality, harvesting, aspects of tree nutrition, protection from pests, and regulatory policies affecting fruit production and sale.

306 Small Fruits Spring. 2 credits. Prerequisite: Pomology 101 or 104 or permission of instructor. Offered alternate years.
Lec, M W 9:05; lab, M 2–4:25. Meets last 9 weeks of term. J. P. Tomkins.
A study of the general principles and practices in the commercial culture of strawberries, brambles, blueberries, currants, gooseberries, elderberries, and cranberries.

307 Viticulture Fall. 2 credits. Prerequisite: Pomology 101 or 104 or permission of instructor. Offered alternate years.
Lec, T R 9:05; lab, T 2–4:25. Meets last 9 weeks of term. R. M. Pool.
Viticulture, with emphasis on the viticulture of the Great Lakes region, as a series of interrelated decisions on varieties, sites, vine management, and vine protection, is presented. Those decisions are based on ampelography, meteorology, soils, vine and grape anatomy and physiology, as well as protection of the vine and grapes from injuries, primarily diseases and insects.

310 Postharvest Physiology and Storage of Fruits and Vegetables Fall. 3 credits. Prerequisite: a course in pomology or vegetable crops, or permission of instructor.
Lec, M W 9:05; lab, F 2–4:25. One Saturday field trip is required. F. W. Liu.
The chemistry and physiology of fruits and vegetables as they affect quality and marketability are studied. Maturity indices, handling methods, and storage practices are considered. Practical work includes observations of the effect of handling and storage methods on quality and condition of fruits and vegetables. One Saturday field trip is required.

[311 Fruit Crop Systematics Fall. 1 credit. S-U grades optional. Prerequisite: Pomology 101 or 104 or permission of instructor. Offered alternate years. Not offered 1979–80.
Lec, T R 9:05; lab, T 2–4:25. Meets first four and a half weeks of term. G. H. Oberly.
The classification of fruit species is considered from a botanical and production viewpoint. The course deals with the identification and naming of fruit species and varieties and their botanical classification.]

[313 Utilization of Fruit Crops Fall. 1 credit. S-U grades optional. Prerequisite: Pomology 101 or 104 or permission of instructor. Offered alternate years. Not offered 1979–80.
Lec, T R 9:05; lab, T 1:25–4:25. Meets middle four and a half weeks of term. F. W. Liu.
A consideration of the fate after processing of fruits produced for consumption. The coverage of fruit products is generally limited to those commercially grown and processed in New York State. Although the discussion includes methods of canning, freezing, dehydration, and other types of processing, emphasis is on the quality requirement and proper handling of raw materials and how they affect the quality of end products.]

[315 Fruit Variety Improvement Fall. 1 credit. S-U grades optional. Prerequisite: Pomology 101 or 104 or permission of instructor. Offered alternate years. Not offered 1979–80.
Lec, T R 9:05; lab, T 2–4:25. Meets last four and a half weeks of term. Staff.
The techniques and limitations of producing new varieties of perennial fruit crops are considered.]

400 Undergraduate Seminar Spring. 1 credit. S-U grades only. May be taken twice for credit. Prerequisite: a course in pomology.
Hours to be arranged. Staff.
Seminar topics and speakers selected and arranged by the students on subject areas related to pomology.

[402 Special Topics in Experimental Pomology Spring. 3 credits. Open to undergraduates by permission. Offered alternate years. Not offered 1979–80.
Hours to be arranged. Staff.
Selected topics are considered with respect to the current literature or experimental techniques. Topics reflect the research interests of the professors who participate.]

604 Growth and Development of Woody Plants Spring. 2 credits. Prerequisite: introductory plant physiology. Offered alternate years.
T R 9:05. L. E. Powell.
An advanced course dealing with physiological, morphological, and biochemical changes during development, beginning with the seed and advancing through the mature reproductive plant. Hormonal control mechanisms emphasized.

610 Research Fall or spring. 2 or more credits. S-U grades optional. Prerequisite: a course in advanced pomology. Undergraduates must attach to their course enrollment material written permission from the staff member who will supervise the work and assign the grade.
Staff.

700 Graduate Seminar Fall. 1 credit. S-U grades only.
Hours to be arranged. Staff.
Reports by students on current research or literature in experimental pomology or related areas.

710 Teaching Experience Fall or spring. 1 credit. S-U grades only. Prerequisite: permission of instructor.
Hours to be arranged. Staff.
Designed to acquaint pomology graduate students with the methods and materials involved in teaching. The student participates in the design, delivery, and evaluation of segments of a departmental course.

Related Course in Another Department

General Horticulture (Vegetable Crops 103)

Rural Sociology

E. C. Erickson, chairman; M. L. Barnett, F. H. Buttel, H. R. Capener, E. W. Coward, Jr., G. J. Cummings, P. R. Eberts, E. C. Erickson, J. D. Francis, C. C. Geisler, J. C. Preston, B. M. Scott, F. W. Young

100 Introduction to Sociology Fall or spring. 3 credits.
Lec, T R 10:10; disc, M or F 9:05, 10:10, 11:15, 12:20, 1:25, or 2:30. F. H. Buttel and staff.
A general introduction to theory and methods of sociology. Major topics include small groups and interpersonal relations, social stratification and inequality, organizations and bureaucracy, and social and cultural change. Discussions focus on selected issues and recent research, mainly in the United States.

105 Rural Sociology and World Development Problems Spring. 3 credits.
M W F 10:10. Staff.
An examination of the implications of development problems in three related contexts: (1) problems common to all societies, developed and developing; (2) problems found only in particular settings; (3) problems that appear occasionally, often with devastating social effects. Topics include overdevelopment and underdevelopment; small-scale farming in the late-developing nations; the sociology of famine and the green revolution; family and corporate farming in the United States; rural poverty in the United States; appropriate technology, agribusiness, and the multinational corporation; the survival of small communities in industrial society; rural to urban migration; and revolution and violence.

134 Recreation Leadership and Leisure Education Spring. 3 credits. Limited to 25 students. Prerequisite: permission of instructor.
Lec, T 1:25; lab, W 7:30–9:10 p.m. B. M. Scott.
A background and theoretical framework for recreation leadership and leisure education that provides the setting for recreation programming and leadership. Field assignments.

213 Social Indicators and Data Management Spring. 3 credits.
M W F 11:15. P. R. Eberts.
Introductory sociological research methods, from the perspective of social indicators, their construction, sources of data, and their policy relevance. The course also surveys currently reported social indicators for the United States. Students work through computer exercises illustrating basic data management using SPSS programs.

300 Proseminar: Issues and Problems in Rural Society Fall. 1 credit. S-U grades only.
R 12:20–1:35. Staff.
Introduces the student to subject matter of concern to both applied and academic rural sociologists. Focuses on such subjects as migrant workers, agribusiness, rural poverty, rural to urban migration, rural development, agricultural research and people, community development, small farmers in the lesser developed nations. These topics are explored through the use of films and group discussion.

324 Social Organization and the Environment Spring. 3 credits.
M W F 9:05. H. R. Capener.
A discussion of principles involved in our interaction with our physical environment, viewed from a human ecological and ecosystem perspective. Emphasis is given to the function of social organization in human-environment exchanges. Principles are illustrated by referring to both developing and developed societies. The course provides a conceptual framework for understanding and addressing recurring environmental issues.

355 Rural Development and Cultural Change (also Anthropology 314) Fall. 3 credits.
T R 10:10–11:25. Staff.
An analysis of planned social change programs in predominantly agricultural societies. Focusing on problems of administration, socioeconomic development, and the introduction of new practices.

356 Rural Society in America Fall. 3 credits. S-U grades optional.
M W F 9:05. H. R. Capener.
The focus is on gaining a greater understanding and appreciation of the rural sector of American society. From sociological and historical perspectives, the nature of changes in rural society are examined, including the impact of technology on agriculture, other extractive industries, natural resources, the environment, regional variation, the rural-urban dominance theme, comparative life styles, cultural orientations, value patterns, and a look to the future.

[357 Subsistence Agriculture in Transition Spring. 3 credits. Not offered 1979–80.
Lec, T R 10:10–11:25. M. L. Barnett.
An analysis of selected types of peasant communities, drawn from differing ecological conditions. Social structure, systems of farming and land tenure arrangements, and motivational characteristics of subsistence farmers in the context of socioeconomic change. Theoretical and policy aspects of modernization and traditional agriculture and programming for agricultural development.]

358 Sociology of Agriculture Spring. 3 credits.
R 2:30–4:25. E. C. Erickson.
The course examines the basic position of agriculture in rural societies, with emphasis on North America. A major focus is on the impact of organizational structure on how agriculture operates. Another is on the causes of technological change and its consequences for agriculture in terms of size, economic efficiency, quantity, and quality. Unintended consequences are also explored.

380 Independent Honors Research in Social Science 1–6 credits. Limited to students who have met the requirements for the honors program. A maximum of 6 credits may be earned in the honors program.
Staff.

404 Advanced Principles of Sociology (also Sociology 404) Spring. 4 credits.
T 2:30–4:25. J. Kahl.

***424 Science, Technology, and Social Change** Fall. 3 credits.
T R 11:35–1:05. S. Del Sesto.
The effect of science and technology on the process of social change is examined. Different theories of social change are applied to specific issues in science and technology such as new energy systems, environmental pollution, the management of natural resources, genetic engineering and the relations between science and technology and alienation. The objective is to explain the movement of current events and predict changes and outcomes in these issue areas.

426 Policy Research: Uses, Methods, Case Studies (also Sociology 426) Spring. 3 credits. Prerequisite: a course in multivariate statistics.
T R, hours to be arranged. Staff.

432 Community Structure and Planned Change Fall. 3 credits.
Lec, T R 9:05; disc, to be arranged. J. C. Preston.
Examines the major concepts, trends, and issues in community structure and social change, with emphasis on domestic rural community development. Areas examined include the nature of change and development, organizational analysis, strategies of change, local government structure and options, and community power structure and decision-making processes.

436 Small Towns Spring. 2 or 3 credits.
T 2:30–4:25. G. J. Cummings.
A study of options open to small communities for enhancing the quality of life. The institutions of local government and education are examined in terms of their past performance and potential contributions in dealing with problems associated with living in places with small populations.

[443 Political Structure and Development Fall. 3 credits. S-U grades optional. Limited to upperclass and graduate students. Prerequisite: Rural Sociology 100 or equivalent. Not offered 1979–80.
T R 10:10–11:25. P. R. Eberts.
Comparative analyses of social control issues in the political economies of Western democracies relating to development issues, with attention to the United States. Control is viewed relative to pluralism in productive, allocative, and staffing processes of society. Occupational categories, communities of different size, and institutions responsible for maintaining social order and development are examined.]

[454 Rural Development Policy Analysis Spring. 3 credits. Offered alternate years. Not offered 1979–80.
T R 8–9:55. J. C. Preston.
Focuses on the study of public policies and programs affecting domestic rural development. This includes the use of social indicators in policy formulation and change along with the study of selected policies and programs intended to aid rural areas.]

462 Organization of Rural Health Care Fall. 3 credits.
M W F 2:30. G. J. Cummings.
A review and analysis of alternative organizational models designed for making advances in medical knowledge accessible to people living in rural areas. Policies and organizational approaches from selected countries, including the United States, are compared in terms of effects on health status.

*Pending approval of the College Curriculum Committee.

471 Informal Study Fall or spring. 1–3 credits. S-U grades optional. May be repeated for credit. Undergraduates must attach to their course enrollment material written permission from the faculty member who will supervise the work and assign the grade.
Staff.
Informal study may include a reading course, research experience, or public service experience.

606 Contemporary Sociological Theories of Development Fall. 3 credits.
M W F 11:15. F. W. Young.
A review of theory, empirical studies, and policy prescriptions as applied to communities and regions, especially those in less-developed countries. Diffusionism, human ecology, the Weberian tradition, central place, dependency, and symbolic structural theory are compared.

618 Research Design I Fall. 4 credits.
M W F 10:10; lab to be arranged. J. D. Francis.
First of a two-semester sequence (may be taken individually) in graduate methods. This course discusses problems of measurement, the design of measuring instruments, and problems of reliability and validity. Some common forms of measuring instruments are discussed, including multidimensional techniques. Students are expected to use actual data for labs.

619 Research Design II Spring. 4 credits. Prerequisite: an introductory methods course or a statistics course.
M W F 10:10. J. D. Francis.
The second part of the sequence in graduate methods deals with sampling frames, some pragmatic sampling techniques, and some discussion of statistical analysis procedures appropriate under each. An intermediate-level treatment of the following topics: nonexperimental designs, regression analysis, analysis of variance, analysis of covariance, and causal models. A classic piece of sociological research is one source of illustration and a component of the lab exercises. Students are expected to use actual data to familiarize themselves with data handling and processing.

621 Environmental Sociology Spring. 3 credits.
W 1:25–4:25. F. H. Buttel.
An exploration of various sociological approaches to the study of society and its physical environment and an analysis of major issues relating to the survival base of human societies — particularly overpopulation, the energy and food crises, the limits-to-growth debate, and the conduct of political struggles over energy and environmental policy.

641 Political Economy of Rural and Regional Development Spring. 3 credits. S-U grades optional. Limited to upperclass or graduate students.
T R 10:10–11:25. P. R. Eberts.
An interdisciplinary course focusing on social, political, and economic factors in regional development. Theories from demography, ecology, social organization, and planning are used to examine the emergence of new forms of social organization and their implications for contemporary America.

[642 Macrosystems Theory and Policy Analysis Spring. 3 credits. S-U grades optional. Not offered 1979–80.
F 12:20–2:15; disc to be arranged. P. R. Eberts.
An analysis of major theoretical and research problems related to the application of systems theory to society's changing organizational process. Major theories are examined, with attention to their compatibility with modern analytic techniques such as simulations and projections in analyzing current issues in macropolitical economy.]

650 Social Organization of Agriculture Fall. 3 credits.
R 1:25–4:25. E. C. Erickson.
Concentrates on a small number of significant commercial crops, examining the institutions and relationships involved in the production process: research, credit, distribution of inputs, the farm operation, processing, transportation, and marketing. Patterns at the farm and community level, including topics such as settlement, land tenure, ethnic groups, class structures, methods of cooperation, small farmers, labor problems, and information networks. Ecological and physical constraints on production. Emphasis on the influence of national and international structures — political, social, and economic — on the production process, including the role of government and quasi-government units. Examines the historical circumstances giving rise to the present crop systems. Consideration of what rearrangements of the political, social, and economic structures, both domestic and international, are required for change in crop systems, improvement in production, and increased social welfare.

[712 Factor Analysis and Multidimensional Scaling Fall. 4 credits. Prerequisite: previous course work in scaling and statistics. Not offered 1979–80.
M W F 10:10; lab to be arranged. J. D. Francis.
Topics include philosophy of factor analysis, factor analysis models, factoring design, factoring techniques, and comparison with factor analysis models. Multidimensional scaling and discriminant analyses are also discussed. As matrix algebra is an integral part of these procedures, class time is devoted to this topic.]

[715 Macrosocial Accounting Spring. 3 credits. Not offered 1979–80.
R 1:25–4. F. W. Young.
A survey of methods and results for describing a whole country by comparing its subnational units. Topics include varieties of available data and their uses, macrosurveys, basic structural dimensions, selected techniques, the "rural development inventory." Students compile a "country file" and learn the various applications of this approach.]

[717 Regression and Path Analysis Spring. 4 credits. Prerequisite: 2 courses in statistics and 1 in methods. Not offered 1979–80.
M W F 10:10; lab to be arranged. J. D. Francis.
The first part of the course reviews multiple and nonlinear regression. Two-stage least squares models are discussed for sociological data along with a discussion of nonmetric regression. The latter half of the course deals with recursive and nonrecursive path models.]

[723 Social Movements in Agrarian Society Spring. 3 credits. Not offered 1979–80.
T 1:25–4. F. W. Young.
The recent research explosion in this area is approached in terms of the several fundamental explanatory formats, a comparison of class-based and region-based movements, and research on the United States and the Third World.]

[751 Applications of Sociology to Development Programs Fall. 3 credits. Limited to graduate students. Not offered 1979–80.
T R 1:25–4:25. E. C. Erickson.
A consideration of problems of implementing change strategies at national, regional, and institutional levels, especially as they relate to rural development. Focus is also on institutional constraints on the sociologist as a researcher, as a strategist, and as a participant and on the different contexts within which developmental change occurs.]

[754 Sociotechnical Aspects of Irrigation Spring. 2–3 credits. Not offered 1979–80.
Hours to be arranged. M. L. Barnett, E. W. Coward, Jr., G. Levine.

Examines irrigated agriculture and its relation to agricultural development. Emphasis on social processes within irrigation systems and interactions with the social setting. The seminar provides an opportunity to examine systematically the institutional and organizational policy issues associated with the design and operation of systems of irrigated agriculture.]

771 Special Seminar Fall or spring. Credit to be arranged. Limited to graduate students; others by permission of instructor.

791 Teaching Experience Fall or spring. 1–3 credits. S-U grades only. Limited to graduate students.
Staff.
Participation in the ongoing teaching program of the department.

792 Public Service Experience Fall or spring. Credit to be arranged. Limited to graduate students.
Staff.
Participation in the ongoing public service activities of the department.

871–874 Informal Study Fall or spring. Credit to be arranged. Limited to master's and doctoral degree candidates with permission of the graduate field member concerned.

871 Rural Sociology

872 Development Sociology

873 Organization Behavior and Social Action

874 Methods of Sociological Research

881 Research Fall or spring. Credit to be arranged. Limited to master's and doctoral degree candidates with permission of the graduate field member concerned.

Statistics and Biometry

F. B. Cady, W. T. Federer, D. S. Robson, S. J. Schwager, S. R. Searle, D. L. Solomon

Courses in statistics and biometry are offered by the Department of Plant Breeding and Biometry.

200 Statistics and the World We Live In Spring. 3 credits.
Lec, T R 10:10–11:25; disc, M 10:10, 1:25, or 2:30 or T 9:05, 1:25, or 2:30. W. T. Federer.
Focus is on a better consumer understanding of statistical design, data collection, and information. Concepts of statistics, measurements and measuring instruments, data collection, principles of scientific investigation, survey design, questionnaire construction, experiment design, treatment design, graphs, tables, probability, averages, measures of variation, common distributions, confidence intervals, sample size, international and national statistics, and some simple statistical methodology are presented.

408 Theory of Probability Fall. 3 credits. Prerequisites: Mathematics 106, 108, or 112, or permission of instructor.
M W F 10:10. Discs to be arranged. Preliminary exams, Oct. 11, Nov. 13, 7 p.m. S. J. Schwager.
An introduction to probability theory: combinatorics, random variables and their probability distributions, generating functions, and limit theory. Biological and statistical applications are the focus. Can serve as either a terminal course in probability or as a foundation for a course in the theory of statistics.

409 Theory of Statistics Spring. 3 credits. Prerequisite: Statistics 408 or equivalent.
M W F 10:10. Discs to be arranged.
S. J. Schwager.
The concepts developed in Statistics 408 are applied to provide an introduction to the classical theory of parametric statistical inference. Topics include data reduction and the concept of sufficiency, parameter estimation, hypothesis testing, and linear regression. Students seeking training in statistical methodology should consider Statistics 601–607.

416 Matrix Algebra I Fall. 2 credits. Prerequisite: precalculus mathematics.
Lec, M W F 8; disc, M 1:25–2:15 (first 7 weeks).
S. R. Searle.
Definitions, basic operations and arithmetic, determinants, and the inverse matrix. Emphasis is on understanding basic ideas.

417 Matrix Algebra II Fall. 2 credits. Prerequisite: Statistics 416 or permission of the instructor. No auditors.
Lec, M W F 8; disc, M 1:25–2:15 (second 7 weeks). S. R. Searle.
Rank, linear dependence, canonical forms, linear equations, generalized inverses, characteristic roots and vectors. Emphasis is on developing skills for applying matrix algebra.

600 Statistics Seminar Fall or spring. 1 credit. S-U grades only.
W 3. Staff.

601 Statistical Methods I Fall. 4 credits. Limited to graduate students; others by permission of instructor.
Lec, M W F 9:05 or 11:15; lab, M 12:20–1:50, 2:30–4, or 7:30–9 or T 12:20–1:50 or 2:30–4. Preliminary exams, Oct. 16, Nov. 15, 7 p.m.
D. L. Solomon.
Statistical methods, both parametric and nonparametric, are developed and used to analyze data arising from a wide variety of biological situations. Topics include point and interval estimation, hypothesis testing, inference for a single population, comparisons between two populations, regression and correlation analysis, and one-way analysis of variance. Emphasis is on basic principles and criteria for selection of statistical techniques.

602 Statistical Methods II Spring. 4 credits. Prerequisite: Statistics 601 or equivalent.
Lec, M W F 9:05 or 11:15; lab, M 12:20–2:15 or 2:30–4:25 or T 11:15–1:10 or 1:25–3:20.
B. F. Cady.
Continuation of Statistics 601. Emphasis on data analysis and inference for a wide variety of research situations using standard multiple-regression programs. Topics include estimating and interpreting multiple-regression models, prediction, residual plotting, model building, estimation of standard errors, analysis of sample means from one-way and multiway classifications, factorial experiments, covariance analysis, comparison of regression lines, model (variable) selection with many predictor variables, principles of experimental design, nested and random effects models, contrasts and pairwise comparisons among means, and transformations of data.

[605 Applied Regression Analysis Fall. 1 credit. Prerequisite: Statistics 602 (604 in 1975–78). Offered alternate years. Not offered 1979–80.
F. B. Cady.
A continuation of Statistics 602, with emphasis on data analysis using a regression or linear model approach. Comparison of variable selection procedures. Biased estimation. Variable selection for prediction. Regression approach to nonorthogonal analysis of variance situations. Case study for complex data set.]

[606 Sampling Biological Populations Fall. 1 credit. Prerequisite: Statistics 601 or equivalent. Offered alternate years. Not offered 1979–80.
D. S. Robson.
Standard methods of socioeconomic sample survey design and estimation are presented, including stratified-random sampling, cluster sampling, double sampling, and variable probability sampling. Special emphasis given to methods of particular utility or specifically designed for biological sampling. Examples are taken from forestry, fisheries, and other biological areas.]

607 Nonparametric and Distribution-Free Statistical Methods Spring. 1 credit. Prerequisite: Statistics 601 or equivalent. Offered alternate years.
M W F 12:20, Jan. 21 to Feb. 20. D. L. Solomon.
Nonparametric and distribution-free alternatives to normal-theory testing procedures are presented. Analysis of variance of ranked data and nonparametric regression analysis are emphasized. Other topics include analysis of categorical data, nonparametric multiple comparisons, goodness-of-fit testing, and randomization tests.

[662 Mathematical Ecology (also Biological Sciences 662) Spring. 3 credits. Prerequisites: a year of calculus, a course in statistics. Offered alternate years. Not offered 1979–80.
D. L. Solomon and S. A. Levin.
Mathematical and statistical analysis of populations and communities: theory and methods. Spatial and temporal pattern analysis, deterministic and stochastic models of population dynamics. Model formulation, parameter estimation, simulation, and analytical techniques. Diversity measures, life tables, ordination, and gradient techniques.]

699 Special Problems in Statistics and Biometry Spring. 3 credits. S-U grades only. Prerequisites: Statistics 417 and 717 or permission of instructor.
T R 10:10–11:25. S. R. Searle.
Current topics in linear models: recent results in matrix algebra, in analysis of variance calculations for unbalanced data, and in variance components estimation. Elements of multivariate statistical analysis.

701 Advanced Biometry Spring. 3 credits. Prerequisites: Statistics 409 and 602.
T R 1:30–2:45. D. S. Robson.
Bioassay methods including parametric and nonparametric statistical analyses of quantal and graded response to controlled levels of single and multifactor stimuli; directional statistics as applied to animal orientation experiments; compartment models and analyses; enzyme kinetics and pharmacokinetic analysis; bioavailability; designs and analyses for ecological damage assessment.

713 Experiments Design Fall. 4 credits. Prerequisites: Either Statistics 416 and 602 or equivalent. Offered alternate years.
T R 8–9:50; disc to be arranged. W. T. Federer.
Principles and techniques of experimentation, theoretical concepts, extensions and variations of the completely randomized, generalized blocked, and generalized row by column experiment designs, interval estimation for ranked means, transformations, unequal variances, additivity, residual analyses, sample size, variance component analyses, unequal number analyses, the place of orthogonality, balance and confounding in design, and advanced statistical methodology.

[714 Treatment Design and Related Experiment Designs Fall. 4 credits. Prerequisites: Statistics 416–417 and 602. Offered alternate years. Not offered 1979–80.
W. T. Federer.
Treatment design, the selection of treatments for an experiment, is divided into factorial, response surfaces, mixtures, and combinations of these. Single degree of freedom contrast matrices, factorial design theory for prime powers and nonprime powers, confounding, split plot, split block, complex confounded designs, lattice designs derivable from pseudofactorial theory, fractional replication, response surface designs, and designs and analyses for mixtures, including diallel crossing designs, are covered. Statistical analyses involving residual

analyses and real data are included. Emphasis is on concepts and applications rather than mathematical manipulations.]

[717 Linear Models Spring. 3 credits. S-U grades only. Prerequisites: Statistics 409, 417, and 605 or Mathematics 472. Offered alternate years. Not offered 1979–80.
S. R. Searle.
Introduction to multinormal variables and distribution of quadratic forms; linear statistical models, estimable functions and testable hypotheses, regression models, experimental design models, and variance component models and combinations thereof.]

[719 Multivariate Analysis Spring. 3 credits. S-U grades only. Prerequisites: Statistics 409, 417, and 605 or Mathematics 472. Offered alternate years. Not offered 1979–80.
T R 10:10. S. R. Searle.
Basic topics in multivariate analysis are covered: multinormal variables, estimation, Wishart distribution, generalized T^2 and generalized variance, principal components, canonical correlations, and factor analysis, with emphasis on establishing and understanding of the detailed development of multivariate procedures.]

[720 Statistical Design Theory Fall. 3 credits. S-U grades only. Prerequisites: Mathematics 431–432 and a course in design theory. Not offered 1979–80.
W. T. Federer.
Primarily for those doing research on statistical design topics. Areas discussed are generalizations of balanced and partially balanced block design theory, F-square and latin square geometries, variance and other optimality criteria, fractional replication, and other topics of interest to participants. Many unsolved statistical design problems are posed.]

799 Statistical Consulting Fall and spring. 2 credits. Limited to graduate students.
Consulting, 1 hour a week; disc, 1 hour a week.
Time to be arranged. Staff.
Participation in the Biometrics Unit consulting service: supervised statistical consulting with members of the Biometrics Unit faculty and researchers from other disciplines. Discussion sessions to consider consultations of interest encountered by the service during the previous week.

890–990 Research Fall or spring. Credit to be arranged. S-U grades only. Limited to candidates for graduate degrees. Prerequisite: permission of the graduate field member concerned.
Research at the M.S. (890) or Ph.D. (990) level.

Vegetable Crops

R. D. Sweet, chairman; L. Ellerbrock, E. E. Ewing, J. R. Hicks, W. C. Kelly, P. M. Ludford, P. L. Minotti, H. M. Munger, R. F. Sandsted, L. D. Topoleski, D. H. Wallace

103 General Horticulture Spring. 4 credits. Each lab limited to 25 students.
Lec, M W F 8; lab, M T W R or F 2–4:25.
L. D. Topoleski.
Includes flower, fruit, and vegetable growing. Primarily for students who want a general knowledge of the subject or who want to specialize in horticulture but have a limited background in practical experience or in training in plant science.

123 Organic Gardening Spring. 2 credits. Each section limited to 20 students. Prerequisite: permission of instructor.
M T W or R 1:25–4:25. W. C. Kelly.
For students not enrolled in the College of Agriculture and Life Sciences. Students must be prepared to lead a discussion and write a paper on some aspect of home gardening or amateur horticulture. Organic methods of gardening are discussed and demonstrated, but other methods are not excluded from the discussions.

[210 Vegetable Types and Identification Fall. 2 credits. Not offered 1979–80.
T 10:10–12:05 or 2–4. L. D. Topoleski.
Acquaints the student with the vegetable species grown in the Northeast and the pests and disorders encountered in their production. Subjects covered include identification of economically destructive weeds, diseases and insects of vegetables, identification of vegetable and weed seeds, seedlings, nutrient deficiencies, vegetable judging, grading, and grade defects.]

211 Commercial Vegetable Crops Fall. 4 credits. Prerequisite: Vegetable Crops 103 and Agronomy 200. Limited to 50 students.
Lec, M W F 11:15; lab, W or F 2–4:25; field trips (Sept.), W 11:15–6. E. E. Ewing.
Intended for those interested in the commercial vegetable industry from the viewpoint of production, processing, marketing, or the related service industries. Topics included are techniques, problems and trends in the culture, harvesting, and storage of the major vegetable crops, including potatoes.

312 Postharvest Handling and Marketing of Vegetables Fall. 3 credits.
Lec, T R 9:05; lab, R 2–4:25; field trips in early fall.
J. R. Hicks.
Procedures used in marketing and shipping vegetables, including grade standards, methods of grading, packaging, harvesting methods, cooling principles, storage techniques, and market preparation.

401 Vegetable Crop Physiology Fall. 5 credits. Prerequisites: Vegetable Crops 211 and Biological Sciences 242 or equivalents.
Lec, M W F 11:15; lab, M 2–4:25; disc, R or F 1, 2, or 3. W. C. Kelly.
Subjects include mineral nutrition as influenced by fertilization programs and crop sequence; nutrient interactions and induced deficiencies; growth and development; flowering; fruit setting; growth correlation; senescence; sex expression; photoperiodism; vernalization; and environmental factors affecting growth.

[413 Kinds and Varieties of Vegetables Fall. 3 credits. Prerequisite: Vegetable Crops 211 or permission of instructor. Offered alternate years. Not offered 1979–80.
Lab, W F 2–4:25.
Designed to help students achieve proficiency in the evaluation of vegetable varieties through study of their origins, characteristics, adaptation, and usage. An important part of the course is the study of crops in the field. The vegetable seed industry is also discussed.]

421 Plant-Plant Interaction Spring. 3 credits. Prerequisites: Agronomy 200 and another crop production course. Biological Sciences 242 recommended.
Lec, M W 8; disc, F 8 and as arranged.
P. L. Minotti.
The manner in which plants affect the growth of other plants is examined using literature on both competition and allelopathy to illustrate principles. Emphasis is on crop situations rather than natural plant communities. Competition in monoculture is considered, as well as weed-crop and crop–associate crop interactions. Greenhouse miniexperiments illustrating selected aspects of competition between weeds and vegetables are conducted by students.

499 Undergraduate Research Fall or spring. 1 or more credits, by arrangement. Written permission from staff member directing the work must be obtained before course enrollment.
Hours to be arranged. Staff.
Special problems may be elected in any line of vegetable work.

601 Seminar Fall or spring. 1 credit. S-U grades only. Required of graduate students majoring or minoring in vegetable crops. Limited to graduate students.
R 4:30. Staff.

610 Special Topics in Vegetable Crops Fall or spring. 1 or more credits. Prerequisite: permission of instructor.
Hours to be arranged. Fall, R. Villereal; spring, to be announced.
Fall, vegetable production in the tropics; spring, to be announced.

612 Postharvest Physiology of Horticultural Crops Spring. 2 credits. Prerequisite: permission of instructor. Offered alternate years.
T R 8. P. M. Ludford.
Physiological and biochemical aspects of growth and maturation, ripening, and senescence of harvested horticultural plant parts. Topics include morphological and compositional changes in ripening and during storage life, some physiological disorders, aspects of hormone action and interaction, and a consideration of control.

620 Teaching Experience Fall or spring. 1 or more credits by arrangement with instructor.
Hours to be arranged. Staff.
Participation in the teaching program of the department.

[630 Research Methods in Applied Plant Science Spring. 3 credits. Prerequisite: permission of instructor. Offered alternate years. Not offered 1979–80.
T R 9:05–11. W. C. Kelly.
The planning of applied research programs. The advantages and limitations of conventional experimental designs as they apply to specific research problems. Discussions include a critical interpretation of experimental results from the literature.]

801 Master's Thesis Research Fall or spring. Credit to be arranged.
Hours to be arranged. Staff.

901 Doctoral Thesis Research Fall or spring. Credit to be arranged.
Hours to be arranged. Staff.

Related Course in Another Department

Special Topics in Plant Science Extension (Plant Breeding 629)

College of Architecture, Art, and Planning

Architecture

Architectural Design

A **studio fee** of $10 is charged each semester for every design course.

Sequence Courses

101 Design I Fall. 3 credits. Studio and lecture. Open to department students only.
M W F 2–6. Staff.
An introduction to design as a conceptual discipline directed at the analysis, interpretation, synthesis, and transformation of the physical environment. Exercises are aimed at developing an understanding of the issues, elements, and processes of environmental design.

102 Design II Spring. 3 credits. Studio and lecture. Open to department students only.
M W F 2–6. Staff.
A continuation of Architecture 101. Human, social, technical, and aesthetic factors related to space and form. Design problems range from those of the immediate environment of the individual to that of small social groups.

201–202 Design III and IV Fall and spring. 4 credits each term. Studio and seminar. Coregistration in Architecture 231–232 required. Open to department students only.
M W F 2–6. Staff.

301–302 Design V and VI Fall and spring. 6 credits each term. Studio and seminar. Open to department students only.
M W F 2–6. Staff.

401–402 Design VII and VIII Fall and spring. 6 credits each term. Studio and seminar.
M W F 2–6. Staff.
Programs in architectural design, urban design, or architectural technology and environmental science are offered each term.

501 Design IX Fall or spring. 8 credits. Studio.
M W F 2–6. Staff.

502 Design X–Thesis Fall or spring. 8 credits. Studio. Required of all students who are candidates for the B.Arch degree, who must satisfactorily complete a thesis during one term of their last year in residence. Students accepted for admission to the graduate studio are exempt from the thesis requirement.
M W F 2–6. Staff.

503–504 Design IX–Thesis I and Design X–Thesis II Fall or spring. 8 credits each term. Studio. Prerequisite: permission of department.
M W F 2–6. Staff.
Students who have obtained approval may elect to spend two terms working on the thesis.

510 Thesis Introduction Fall or spring. 2 credits. Lecture and seminar. Required of all architecture students in the year preceding their thesis.
T 1:25–3:20. Staff.
Lectures, seminars, and independent research leading to complete development of the student's thesis program. General instruction in the definition, programming, and development of a thesis is followed by tutorial work with the student's advisory committee.

601–602 Special Program Fall or spring. 9 credits each term. Intended primarily for students applying to a graduate program in the college.
Hours to be arranged. Staff.

111–112 Elective Design Studio 111, fall; 112, spring. 3 credits each term. Limited to students from outside the department. Prerequisite: permission of department office. Coordinated by the Department of Architecture office.
M W F 2–6. Staff.

200, 300, 400, 500 Elective Design Fall or spring. Credit as assigned. Open by permission to transfer students who have not been assigned to a sequence course. Prerequisite: permission of department office. Each student is assigned to a class of appropriate level.
M W F 2–6. Staff.

Nonsequence Courses

310 Special Problems in Architectural Design Fall or spring. Registration and credit by arrangement.
Hours to be arranged. Staff.
Independent study.

[611–612 Urban Housing Developments 611, fall; 612, spring. 2 credits each term. Seminar. Limited to fourth- and fifth-year students in architecture, and graduate students. Prerequisite: permission of instructor. Not offered 1979–80.
Hours to be arranged. O. M. Ungers.
Large-scale housing developments, particularly in relation to size, density, and problems of infrastructure.]

[613 Transportation Fall. 2 credits. Prerequisite: permission of instructor. Not offered 1979–80.
Seminar, R 3:30–5:30. P. Cohen, A. Meyburg.
The impact of various transportation forms upon the environment are considered from the perspectives of architects, engineers, planners, and human ecologists. Readings and discussions of past, current, and future transportation modes focuses on aesthetic and physical aspects.]

614 Low-Cost Housing Spring. 3 credits. Prerequisite: permission of instructor.
Seminar, T R 1:25–2:15. F. O. Slate, P. Cohen, C. B. Daniels, H. W. Richardson.
Presents aspects of low-cost housing involving engineering technology, architecture, physical planning, economics, and sociology.

618–619 Seminar in Urban and Regional Design 618, fall; 619, spring. 3 credits each term. Limited to fifth-year and graduate students.
Hours to be arranged. O. M. Ungers, staff, and guest lecturers.
A broad range of issues and problems of urban and regional development and the context in which the designer functions are surveyed. Selected case studies are presented by the participants and visitors.

Graduate Courses

711–712 Problems in Architectural Design 711, fall; 712, spring. 9 credits each term. Studio and seminar.
Hours to be arranged. O. M. Ungers.
The basic first-year design course for graduate students whose major concentration is architectural design.

713–714 Problems in Urban Design 713, fall; 714, spring. 9 credits each term. Studio and seminar.
Hours to be arranged. C. Rowe.
The basic first-year design course for graduate students whose major concentration is urban design.

715–716 Problems in Regional Design 715, fall; 716, spring. 9 credits each term. Studio and seminar.
Hours to be arranged. Staff.
The basic first-year design course for graduate students whose major concentration is regional design.

811 Thesis or Research in Architectural Design Fall or spring. 9 credits.
Hours to be arranged. O. M. Ungers.
Second-year design course for graduate students whose major concentration is architectural design.

812 Thesis or Research in Urban Design Fall or spring. 9 credits.
Hours to be arranged. C. Rowe.
Second-year design course for graduate students whose major concentration is regional design.

Structures

Sequence Courses

221 Mathematical Techniques Fall. 3 credits. Two lectures and one recitation.
T R 10:10–11. Mathematics department staff.
Mathematical concepts and operations used in architecture are introduced.

222 Structural Concepts Fall or spring. 4 credits. Lectures and seminars. Prerequisite: Architecture 221 or approved equivalent.
T R 9:05–11. F. W. Saul.
Fundamental concepts of structural behavior. Statics and strength of materials.

321 Structural Systems I Fall. 3 credits. Lectures and seminars. Prerequisites: Architecture 221 and 222.
T R 11:15–1:10. F. W. Saul.
Structural design concepts and procedures for steel building construction.

322 Structural Systems II Spring. 3 credits. Prerequisite: Architecture 222.
T R 11:15–1:10. F. W. Saul.
Structural design concepts and procedures for reinforced concrete building construction.

Nonsequence Courses

323 Advanced Steel Building Design Fall. 3 credits. Seminar. Prerequisites: Architecture 321 and permission of instructor.
M W F 10:10–11. F. W. Saul.
Design and investigation of advanced systems of steel building structure, plastic design of continuous beams, rigid frames, and high-rise buildings.

[324 Surface Structures Spring. 3 credits. Seminar. Permission of instructor required. Not offered 1979–80.
D. P. Greenberg.
The qualitative and quantitative analysis and design of thin shell architectural structures, including shells of revolution, cylindrical shells, hypars, and folded plates. Suspension structures. The architectural implications and problems of curvilinear forms. Construction techniques.]

326 Building Substructure Spring. 3 credits. Seminar. Prerequisites: Architecture 322 or concurrent registration and permission of instructor.
Hours to be arranged. F. W. Saul.
The principles of soil mechanics and subsurface exploration. Design of building foundations — footings, piles, and subgrade walls.

328 Advanced Reinforced Concrete Building Systems Spring. 3 credits. Seminar. Prerequisites: Architecture 322 and permission of instructor.
Hours to be arranged. Staff.
Methods and specifications for the design and construction of reinforced concrete building systems

are received. Two-way framing systems. Precast concrete construction. Discussion of ultimate strength and yield line theories. Quality control of reinforced concrete. Exploration of new techniques in concrete construction. Other selected topics.

Architectural Principles, Theories, and Methods

Sequence Courses

131 Introduction to Architecture Fall. 2 credits. Open to students in other colleges.
Lec, T 1:25–4. Staff.
The built and natural environments are introduced as a context for culture. Architecture as an environmental design discipline and its relation to other fields is discussed.

231 Architectural Elements and Principles Fall. 3 credits. Studio and lecture. Architecture students must register concurrently in Architecture 201.
T R 1:30–3:25. Staff.
Theory of the order, perception, and function of architectural space. Discourse on the nature of architectural systems and an examination of the multiplicity of ways they can be used to solve architectural problems.

232 Design Methods and Programming Spring. 3 credits. Studio and lecture. Architecture students must register for this course concurrently with Architecture 202.
T R 1:30–3:25. Staff.
Basic methods for developing architectural programs. Programming as a conceptual as well as a descriptive task is emphasized. Basic methods of design. Analytic and synthetic skills are stressed.

630–631 Advanced Seminar in Architecture 630, fall; 631, spring. 1 credit each term. Required of all fifth-year architecture students. Open to graduate students.
Hours to be arranged. Staff and visiting critics.

Nonsequence Courses

331 Special Problems in Principles, Theories, and Methods Fall or spring. Registration and credit by arrangement.
Hours to be arranged. Staff.
Independent study.

[333 Computer Applications Spring. 3 credits. Prerequisites: one term of calculus (Architecture 221 or equivalent), one term of FORTRAN programming, and Computer Science 100 and 106, or equivalent. Not offered 1979–80.
Hours to be arranged. D. P. Greenberg.
Current uses and potentials of digital computers in the architecture profession are introduced. Topics include architectural and planning models, structural analyses, energy simulation, critical path scheduling, and computer graphics.]

334 Computer Graphics Fall. 3 credits. Prerequisites: two terms of calculus, and Computer Science 211, or equivalent.
T R 10:10–11. D. P. Greenberg.
Introduction to the principles of interactive computer graphics, including input techniques, display devices, display files, interactive graphic techniques, two- and three-dimensional computer graphics, perspective transformations, hidden line and hidden surface algorithms, and color picture generation.

335–336 Theory of Architecture 335, fall; 336, spring. 3 credits each term. Prerequisite: Architecture 231–232 or permission of instructor.
Lec, T R 4:40–6:30 p.m. L. Hodgden.

437–438 Special Projects in Computer Graphics 437, fall; 438, spring. Variable credit. Prerequisites: Architecture 334 plus concurrent registration in Computer Science 314 or equivalent, and permission of instructor. Limited to third-year students and above.
Hours to be arranged. D. P. Greenberg.
Advanced work in computer graphics input and display techniques, including storage tube, dynamic vector, and color raster displays.

[531–532 Computer-Aided Structural Design 531, fall; 532, spring. 4 credits each term. Prerequisites: Architecture 334 and Engineering CEE G301–G302, Structural Engineering, concurrent registration in CEE G612 Advanced Structural Analysis, and permission of instructor. Limited to fourth-year students and above. Not offered 1979–80.
D. P. Greenberg.
Advanced topics involving interactive computer graphics and advanced structural analysis techniques.]

533–534 Computer-Aided Environmental Design 533, fall; 534, spring. 4 credits each term. Prerequisites: Architecture 334, 362 and one year of college physics, and permission of instructor. Limited to fourth-year students and above.
Staff.
Advanced topics involving interactive computer graphic and advanced environmental design techniques. Topics may include acoustics, lighting, and energy analyses.

633–634 Introduction to Comparative Theories in Inquiry 633, fall; 634, spring. 3 credits each term. Seminar. Limited to third-year students and above.
Hours to be arranged. D. M. Simons.
The study of approaches to problem inquiry: the formal procedures of the fields of architecture, natural sciences, and applied sciences and the aesthetic and rational intelligences exemplified in these. Discussions of significant writings from various fields.

639 Principles of Design Process Fall. 3 credits. Limited to third-year architecture students and above. Students in other colleges by permission of instructor.
Seminar, M W 10:10–12:05. A. Mackenzie.
Analysis of the major theories and techniques of design developed during the past fifteen years, with special emphasis on application to the solution of whole problems in architectural design.

Note: **667–668 Architecture in Its Cultural Context I and II** is accepted as a theory course.

Architectural History

Sequence Courses

141–142 History of Architecture I and II 141, fall; 142, spring. 3 credits each term. Students in other colleges may take either or both terms for credit.
Lec, T R 11:15–1:10. C. F. Otto and staff.
History of architecture as social and cultural expression of Western civilization. Selected examples from Mesopotamia to the eighteenth century are considered in History 141; history of modern architecture is discussed in 142.

Nonsequence Courses

244 History of Preindustrial Building Spring. 4 credits.
Lec, hours to be arranged. W. W. Cummer.
The development of traditional architectural elements and forms; materials, methods, and design expression.

[340 Architecture of the Ancient Near East Spring. 3 credits. Lecture. Prerequisite: Architecture 141 or permission of instructor. Not offered 1979–80.
W. W. Cummer.
Architecture of the oldest historic civilizations associated with Western tradition. Emphasis is on Egypt, Mesopotamia, and Anatolia.]

341 Architecture of the Classical World Fall. 3 credits. Prerequisite: Architecture 141 or permission of instructor.
T R 9:05–11. W. W. Cummer.
Architecture of the ancient Mediterranean civilizations, with emphasis on Greece and Rome.

[343 Introduction to the History of Urban Planning (also CRP 400) Fall. 3 credits. Not offered 1979–80.
J. W. Reps, W. W. Cummer.
Survey of urban planning in Western civilization from the Greeks and Romans through medieval, Renaissance, and modern Europe and colonial and nineteenth-century America.]

[344 Islamic Architecture 3 credits. Lecture. Prerequisite: permission of the instructor. Not offered 1979–80.]

346 The Renaissance Fall or spring. 3 credits. Prerequisites: Architecture 141–142 and permission of instructor.
Lec, T R 9:05–11. C. F. Otto.
European architecture and city planning of the fifteenth and sixteenth centuries.

347 The Baroque Fall or spring. 3 credits. Prerequisites: Architecture 141–142 and permission of instructor.
Lec, T R 9:05–11. C. F. Otto.
European architecture and city planning of the seventeenth and eighteenth centuries.

348 American Architecture I and II Fall and spring. 3 credits. Prerequisites: Architecture 141–142 or permission of instructor.
Lec, T R 11:15–1:10. Staff.
Fall: building in the United States from the colonial period through 1860; spring: building after 1860.

349 Modern European Architecture Fall. 3 credits. Prerequisite: permission of instructor.
M W 11:15–1:10. C. F. Otto.
A survey of nineteenth- and twentieth-century architecture and city planning in Europe.

442 Historical Seminars in Architecture Fall or spring. 2 credits. Prerequisite: permission of instructor.
Hours to be arranged. Staff.
Using historical evidence, students prepare papers discussing problems relating to design or architecture.

445 Special Investigations in the History of Architecture Fall or spring. Variable credit. Prerequisite: permission of instructor.
Hours to be arranged. Staff.
Independent study.

[447 History Workshop Fall or spring. Variable credit. Seminar hours to be arranged. Staff. Not offered 1979–80.]

448 Historical Lectures in Architecture Fall or spring. Variable credit. Prerequisite: permission of instructor.
Lec, hours to be arranged. Staff.
A series of one or two lectures per week on topics related to architectural history.

540 Architectural Problems in Archaeological Fieldwork Spring. 3 credits.
Seminar, hours to be arranged. W. W. Cummer.
A review and critique of students' participation in the excavation of ancient cities or historic sites during the previous summer. For students in architecture and archaeology.

541 Surveying for Archaeologists Fall. 3 credits.
T 2:30–4:25. W. W. Cummer and staff.
The excavation architect on an archaeological team. Methods of site survey, recording ancient buildings,

and preparation of working, analytic, and restored drawings. For students in architecture or archaeology who anticipate joining a summer excavation.

542 Methods of Archival Research (also CRP 404) Spring. 3 credits.
Lec, R 10:10–12:05. K. C. Parsons.
Examination of methods for research in the history of architecture and urban development, using archival materials such as manuscripts, drawings, correspondence, and documents in the Cornell University archives and regional history collections.

544 Case Studies in Preservation Planning Fall or spring. 2 credits.
Seminar, T 2:30–4:25. Staff and visiting lecturers.
A review and critique of preservation planning projects selected to indicate the range of current approaches.

545 Design and Conservation (also CRP 844) Fall or spring. 2 credits.
Seminar, M 2:30–4:25. B. Jones and staff.
Introductory course for preservation planning. The rationale for and methods of using existing cultural and aesthetic resources in the planning and design of regions and cities.

546 Documentation for Preservation Planning (also CRP 845) Spring. 2 credits.
Seminar, hours to be arranged. Staff and visiting lecturers.
Methods of collecting, recording, processing, and analyzing historical architectural and planning materials.

547 Preservation Planning Workshop Fall or spring. 2 credits. Seminar.
Hours to be arranged. Staff and lecturers.
Seminar with visiting professionals, readings, and reports.

548 Problems in Modern Architecture Spring. 2 credits. Prerequisite: permission of instructor.
Lec, hours to be arranged. Staff.

[640 Seminar in Architecture of the Ancient Near East Fall. 4 credits. Prerequisite: Architecture 340 or permission of instructor. Not offered 1979–80.
W. W. Cummer.
Problems in Near Eastern architectural history.]

641 Seminar in Architecture of the Classical World Spring. 4 credits. Prerequisite: Architecture 341 or permission of instructor.
Hours to be arranged. W. W. Cummer.
Problems in Greek and Roman architectural history.

645 Building Material Conservation Spring. 3 credits. Limited to upperclass and graduate students.
Lec, T 11:15–1:10. Staff.
A survey of the development of building materials in the United States, chiefly during the nineteenth and early twentieth centuries, and a review of the measures which might be taken to conserve them.

646 Seminar in the Renaissance Spring. 4 credits. Prerequisite: Architecture 346 or permission of instructor.
Seminar, hours to be arranged. C. F. Otto.
Historical problems of European architecture and city planning of the fifteenth and sixteenth centuries.

647 Seminar in the Baroque Spring. 4 credits. Prerequisite: Architecture 349 or permission of instructor.
Seminar, hours to be arranged. C. F. Otto.
Historical problems in European architecture and city planning of the seventeenth and eighteenth centuries.

648 Seminar in the History of American Architecture Fall or spring. 4 credits. Prerequisite: permission of instructor.
Seminar, hours to be arranged. Staff.
Investigation by means of readings, lectures, and reports of historical problems in architecture of the nineteenth and twentieth centuries in the United States.

649 Seminar in the History of Modern Architecture Fall or spring. 4 credits. Prerequisite: permission of instructor.
Seminar, hours to be arranged. Staff.
Problems in modern art and architecture.

Graduate Courses

740 Informal Study in the History of Architecture Fall or spring. Variable credit. Prerequisite: permission of instructor.
Hours to be arranged. Staff.
Independent study.

741 Introductory Seminar in the History of Architecture and Urban Development Spring. 2 credits. Required of graduate students entering the field, and undergraduates in B.F.A. history of architecture program.
Seminar, M 2:30–4:25. C. F. Otto and staff.
Motives, methods, and resources for scholarly work in history of architecture and history of urban development. Discussions, readings, and reports.

840 Thesis in Architectural History Fall or spring. Variable credit.
Hours to be arranged. Staff.
Independent study for the master's degree.

940 Dissertation in Architectural History Fall or spring. Variable credit.
Hours to be arranged. Staff.
Independent research by candidates for the Ph.D. degree.

Design Communications

Sequence Courses

151 Design Fundamentals I Fall. 2 credits. Studio and lecture.
T R 4–6. Staff.
Fundamentals of visual and conceptual organization. Dynamics of perception; spatial organization and its representation. Demonstrative problems of an analytic and conceptual nature.

152 Design Fundamentals II Spring. 2 credits. Studio and lecture.
T R 4–6. Staff.
Theory of visual and conceptual organization, spatial perception, spatial organization and its representation; demonstrative problems of an analytic and conceptual nature.

[251 Advanced Visual Communications Fall or spring. 3 credits. Lecture. Not offered 1979–80.
Staff.
Introduction to photographic tools and methods and their application to architectural presentation and design simulation.]

Nonsequence Courses

251–252 Introductory Photography (Art 161–162) 251, fall; 252, spring. 3 credits each term. Darkroom fee, $20.
T R 3:25–6:30. S. Bowman and staff.
For course description, see Art 161–162.

351 Second-Year Photography (Art 261) Fall. 3 credits. Prerequisite: Architecture 251 or 252, or Art 161 or 162, or permission of instructor. Darkroom fee, $20.
T R 9:05–12:05. S. Bowman.
For course description, see Art 261.

352 Second-Year Photography (Art 262) Spring. 3 credits. Prerequisite: Architectur 251 or 252, or Art 161 or 162, or permission of instructor. Darkroom fee, $20.
Hours to be arranged. Staff.
For course description, see Art 262.

353 Large-Format Architectural Photography Spring. 3 credits. Lecture and studio. Prerequisites: Architecture 251 or 252, or Art 161–162, or permission of instructor. Darkroom fee, $20.
Hours to be arranged. Staff.
The special uses of large-format view camera photography. Emphasis on the creative use of the view camera in architectural photography.

[354 Fundamentals of Motion Film Fall. 3 credits. Lecture and studio. Prerequisites: Architecture 251–252, or Art 161–162, or permission of instructor. Darkroom fee, $20. Not offered 1979–80.
Staff.
Basic principles of 16mm motion picture film, in black and white and color, including use of camera and basic editing techniques.]

[355 Graphic Design Studio Fall or spring. 3 credits. Lecture and studio. Prerequisite: Architecture 152 or permission of instructor. Not offered 1979–80.
Staff.
Design and preparation of materials for reproduction in print media. Studio in typography, available printing processes, and photomechanical methods of reproduction.]

[356 Architectural Simulation Techniques Spring. 3 credits. Lecture and studio. Prerequisite: Architecture 152 or permission of instructor. Not offered 1979–80.
Hours to be arranged. G. Hascup.
Two- and three-dimensional simulation techniques in architecture. Emphasis on simulation of environment, space, materials, and lighting as visual tools for architectural design.]

[451 Advanced Graphic Design Fall or spring. 3 credits. Lecture and studio. Prerequisite: Architecture 355 or permission of instructor. Not offered 1979–80.
Staff.
Design and preparation of materials for reproduction in print media. Emphasis on specialized projects dealing with graphic processes.]

[452 Media Environments Fall or spring. 3 credits. Studio. Prerequisite: Architecture 251 or permission of instructor. Darkroom fee, $20. Not offered 1979–80.
Staff.
Programmed multiple projection presentations as communication systems. Includes the use of multi-screen slides, motion picture film, and sound in the creation of media environment.]

457 Special Project in Photography Fall or spring. Variable credit. Prerequisites: written proposal outlining the special project and permission of instructor. Darkroom fee, $20.
Hours to be arranged. Staff.
Independent study.

[458 Special Project in Design Communication Variable credit. Prerequisite: written proposal outlining the special project and permission of instructor. Darkroom fee, $20. Not offered 1979–80.
Hours to be arranged. Staff.
Independent study.]

[459 Thesis Project in Design Communication Fall or spring. 6 credits. Limited to design communications majors. Prerequisite: written proposal outlining the special project. Not offered 1979–80.
Hours to be arranged. Staff.
Independent study in design communication leading to a thesis project.]

Architectural Science and Technology

Sequence Courses

162 Introduction to Social Sciences in Design Spring. 2 credits.
Lec, M W F 9:05. R. D. MacDougall.
An introduction to concepts and methods in the social sciences for architects; how approaches from anthropology, environmental psychology, and sociology can be used in the study and design of the built environment.

261 Introduction to Environmental Science Fall. 2 credits.
Lec, M W 9:05. R. Crump.
The basic principles involved in inventory and analysis techniques as they relate to design implementation in the outdoor environment. Case studies depicting application of these principles at all scales of land planning and design are presented.

262 Building Technology, Materials, and Methods Spring. 3 credits. Prerequisites: Architecture 162 and 261.
Lec, M W F 10:10. R. Crump.
Properties of materials — their use and application to the design of buildings and building systems. Discussion of various methods of building construction and assembly.

361 Environmental Controls I Fall or spring. 3 credits each term. Prerequisite: Architecture 262.
Lec, W F 11:15. R. Crump.
Basic properties and principles of sound and light. Sound phenomena, noise control, absorption, acoustical design. Light, color, and form. Natural lighting possibilities and constraints. Artificial lighting with good and bad examples.

362 Environmental Controls II Fall or spring. 3 credits each term. Prerequisite: Architecture 361.
Lec, W F 11:15. R. Crump.
Energy conservation. Passive solar design. HVAC distribution systems.

Nonsequence Courses

371 Environmental Technology Workshop I Fall. 2 credits. Studio. Prerequisite or corequisite: Architecture 361.
Hours to be arranged. R. Crump.
The mechanical engineer's task and its relation to the architectural design process. Full-scale and model studies of the role of air movement and temperature in building design. Passive and active solar energy design.

372 Environmental Technology Workshop II Spring. 2 credits. Studio. Prerequisite or corequisite: Architecture 362.
Hours to be arranged. R. Crump.
The tasks of the acoustical consultant, the electrical engineer, and the illumination consultant in relation to the architect's work. Acoustical and lighting design studies using full-scale mock-ups and specific building type studies. Cost factors.

561–562 Special Problems in Architectural Science 561, fall; 562, spring. Variable credit. Prerequisite: permission of science staff instructor.
Hours to be arranged. Staff.
Independent study.

662 Environmental Control Systems Spring. 3 credits. Lecture and seminar. Prerequisite: Architecture 362.
Hours to be arranged. R. Crump.
The influences of the environment on the design of buildings and urban developments. Lecture and workshop exercises utilizing the wind tunnel and artificial sun.

[667–668 Architecture in Its Cultural Context I and II 667, fall; 668, spring. 4 credits each term. Prerequisite: permission of instructor. Not offered 1979–80.
Seminar, T 1:25–3:20. R. D. MacDougall.
Fall term, theory; spring term, method and problem solving. An examination of the relationship between architecture and other aspects of culture. Emphasis on the motivations for particular architectural forms, and especially on theories of architecture. Examples from the United States and Asia.]

Graduate Courses

761–762 Architectural Science Laboratory 761, fall; 762, spring. Variable credit. Open to graduate students only.
Hours to be arranged. Staff.
Projects, exercises, and research in the architectural sciences.

763–764 Thesis or Research in Architectural Science 763, fall; 764, spring. Variable credit. Limited to graduate students.
Hours to be arranged.
Independent study.

The Profession of Architecture

Sequence Courses

481–482 Professional Practice 481, fall; 482, spring. 2 credits each term.
Lec, R 1:25–3:20. Staff.
An examination of organizational and management theories and practices for delivering professional design services. Included are an assessment of the building industry and its influence on practice; an analysis of the basic management functions within professional firms; and the legal concerns facing practitioners today. Sessions with selected guest participants focus on case studies.

Architectural Drawing

191 Analytical Drawing I Fall. 2 credits. Studio.
T R 9:05–11.
Freehand drawing with emphasis on line and perspective representation of form and space.

192 Analytical Drawing II Spring. 2 credits. Studio. Prerequisite: Architecture 191.
T R 9:05–11. Staff.
Freehand drawing as a means of conceiving and expressing spatial form; line weight, shades and shadows, and figure drawing.

Washington Field Program

Fourth- and fifth-year students in good standing who have completed the requirements of the first three years of curriculum are eligible for this program. Students must obtain permission of the program director. Courses offered include Design, Thesis Introduction, Special Problems in Architectural Design, plus the courses listed below. Other course offerings may be available.

480 Professional Studies Fall or spring. Variable credit.
Lec, hours to be arranged. M. Schack and visiting lecturers.
An examination of organizational and management theories and practices for delivering professional design services. Included are an assessment of the building industry and its influence on practice; an analysis of the basic management functions within professional firms; and the legal concerns facing practitioners today. Sessions with selected guest participants focus on case studies.

530 Professional Seminar Fall or spring. 1 credit each term.
Hours to be arranged. Staff and visiting critics.

Art

Most courses in the Department of Art are open to students in any college of the University who have fulfilled the prerequisites and who have the consent of the instructor.

Fees are charged for all Department of Art courses. For freshman and sophomore fine arts majors, the fee is $10 each semester. Students from outside the department are charged $5 a course.

Courses in Theory and Criticism

110 Color, Form, and Space Fall or spring. 3 credits.
Fall: W 10:10–11:30. N. Daly.
A study of traditional and contemporary ways of drawing and painting. An analysis of color theory and pictorial space.

111 Introductory Art Seminar Fall. 1 credit. Limited to freshman B.F.A. candidates.
R 4:30.
Students meet for one hour each week with a different member of the faculty. The varying artistic interests of the staff are presented and discussed.

610 Seminar in Art Criticism Fall or spring. 2 credits. May be repeated for credit. Four terms required of M.F.A. candidates. Open to other graduate students.
Hours to be arranged. J. Seley.
Historical and modern critical opinions and their relation to problems in the theory of art are studied.

Studio Courses in Painting

121–122 Introductory Painting 121, fall; 122, spring. 3 credits each term.
121: sec 1, M W F 9:05–11; sec 2, T R 1:25–4:25; sec 3, T R 9:05–12:05.
An introduction to the problems of artistic expression through the study of pictorial composition; proportion, space, shapes, and color as applied to abstract and representational design.

221–222 Second-Year Painting 221, fall; 222, spring. 3 credits each term. Prerequisite: Art 121 or 122 or permission of instructor.
221: T R 1:25–4:25. Staff.
Study of traditional and contemporary media.

321 Third-Year Painting Fall. 4 credits. Prerequisite: 9 to 12 studio credit hours, depending on major.
T R 10:10–1. Staff.
Continued study of the principles of painting and the selection and expressive use of materials and media. Group discussions and individual criticism.

322 Third-Year Painting Spring. 4 credits. Prerequisite: Art 321.
Staff.
Continued study of the principles of painting and the selection and expressive use of materials and media. Group discussions and individual criticism.

421 Fourth-Year Painting Fall. 4 credits. Prerequisite: Art 322.
T R 10:10–1. Staff.
Further study of the art of painting through both assigned and independent projects, executed in various media. Instruction through group discussions and individual criticism.

422 Senior Thesis in Painting Spring. 4 credits. Prerequisite: Art 421.
Staff.
Advanced painting project to demonstrate creative ability and technical proficiency.

721–722, 821–822 Graduate Painting 721 and 821, fall; 722 and 822, spring. Credit as assigned. May be repeated for credit. Limited to M.F.A. students in painting.
Staff.
Students are responsible, under staff direction, for planning their own projects and selecting the media in which they are to work. All members of the staff are available for individual consultation.

Studio Courses in Graphic Arts

131 Introduction to the Graphic Arts Fall or spring. 3 credits.
Fall: T R 1:25–4:25. Staff.
Students explore the techniques of making impressions, including those that produce the raised surface of the relief print, the lowered surface of the intaglio print, and the flat (planographic) surface of the lithograph.

132 Introductory Silk-Screen Printing Fall or spring. 3 credits.
Fall: T R 9:05–12:05. Staff.
A basic introduction to fine art silk-screen printing. Students explore the use of lacquer film, paper stencil, tusche and glue, and other commonly used procedures of serigraphy.

230 Advanced Intaglio Printing Fall or spring. 3 credits. Prerequisite: Art 131 or 132, or permission of instructor.
Fall, T R 1:25–3:20. P. Thompson.
Continuation of the study and practice of methods of printing from below the surface with emphasis on engraving, lift ground, experimental techniques, and color.

232 Plate Lithography Spring. 3 credits. Prerequisite: Art 131 or 132, or permission of instructor.
A. Singer.
The special problems relating to the use of the aluminum lithographic plate are studied. Particular importance is placed on the role of the plate in color printing.

233 Stone Lithography Fall. 3 credits. Prerequisite: Art 131 or 132, or permission of instructor.
M W F 9:05–11. A. Singer.
The theory and practice of planography, utilizing limestone block. The basic lithographic techniques of crayon, wash, and transfer are studied.

330 Advanced Silk-Screen Printing Fall or spring. 3 credits. Prerequisite: Art 132.
Fall: T R 1:25–4:25. S. Poleskie.
Continuation of Art 132 including photographic stencils, three-dimensional printing, and printing on metal, plastic, and textiles.

331 Advanced Printmaking Fall. 4 credits. Prerequisite: 6 credits of graphic art course work.
T R 9:05–12:05. Staff.
Study of the art of graphics through both assigned and independent projects. Work may concentrate in any one of the graphic media or in a combination of media.

332 Advanced Printmaking Spring. 4 credits. Prerequisite: 6 credits of graphic art course work.
Staff.
Continuation and expansion of Art 331.

335 Printing Workshop Fall or spring. 2 credits. S-U grades only. Prerequisite: a course in printmaking or permission of instructor. Required for printmaking majors.
Hours to be arranged; includes one evening per week in the shop. P. Thompson and staff.
The fundamentals of maintaining a constantly functioning printing facility. The proper use and upkeep of machinery and supplies is stressed.

431 Senior Printmaking Fall. 4 credits. Prerequisite: courses in printmaking.
Hours to be arranged. Staff.
Further study of the art of graphics through both assigned and independent projects executed in various media. Instruction through group discussions and individual criticism.

432 Senior Thesis in Printmaking Spring. 4 credits. Prerequisite: four courses in printmaking.
Hours to be arranged. Staff.
Advanced printmaking project to demonstrate creative ability and technical proficiency.

731–732, 831–832 Graduate Printmaking 731 and 831, fall; 732 and 832, spring. Credit as assigned. May be repeated for credit. Limited to M.F.A. candidates in graphic arts. Prerequisite: permission of instructor.
Staff.
Students are responsible, under staff direction, for planning their own projects and selecting the media in which they will work. Members of the staff are available for consultation; discussion sessions of work in progress are held.

Studio Courses in Sculpture

141–142 Introductory Sculpture 141, fall; 142, spring. 3 credits each term.
141: sec 1, M W F 10:10–12:05; sec 2, T R 9:05–12:05; sec 3, T R 8–11. Staff.
A series of studio problems introduce the student to the basic considerations of artistic expression through three-dimensional design. Modeling in Plasteline, building directly in plaster, and casting in plaster.

241–242 Second-Year Sculpture 241, fall; 242, spring. 3 credits each term. Prerequisites: nonmajors, none: majors, Art 141–142.
241: sec 1, M W F 1:25–3:20; sec 2, T R 1:25–4:25. Staff.
Various materials including clay, plaster, wood, and stone are used for exercises involving figurative modeling, abstract carving, and other aspects of three-dimensional form and design.

341 Third-Year Sculpture Fall. 4 credits. Prerequisite: Art 242.
Sec 1, M W F 1:25–3:20; sec 2, T R 1:25–4:25. Staff.
Continued study of the principles of sculpture and the selection and expressive use of materials and media. Group discussions and individual criticism.

342 Third-Year Sculpture Spring. 4 credits. Prerequisite: Art 341.
Staff.
Continuation and expansion of Art 341.

441 Fourth-Year Sculpture Fall. 4 credits. Prerequisite: Art 342.
Sec 1, M W F 1:25–3:20; sec 2, T R 1:25–4:25. Staff.
Further study of the art of sculpture through both assigned and independent projects executed in various media. Instruction through group discussions and individual criticism.

442 Senior Thesis in Sculpture Spring. 4 credits. Prerequisite: Art 441.
Staff.
Advanced sculpture project to demonstrate creative ability and technical proficiency.

741–742, 841–842 Graduate Sculpture 741 and 841, fall; 742 and 842, spring. Credit as assigned. May be repeated for credit. Limited to M.F.A. students in sculpture.
Staff.
Students are responsible, under staff direction, for planning their own projects and selecting the media in which they are to work. All members of the staff are available for individual consultation. Weekly discussion sessions of works in progress are held.

Studio Courses in Photography

161–162 Introductory Photography 161, fall; 162, spring. 3 credits each term. Darkroom fee, $20.
Fall: T R 3:25–6:30. Staff.
A basic lecture-studio course in black and white photography for beginners. Emphasis is on basic camera skills, darkroom techniques, and understanding of photographic imagery.

261 Second-Year Photography Fall. 3 credits. Prerequisite: Art 161 or 162 or permission of instructor. Darkroom fee, $20.
T R 9:05–12:05. S. Bowman.
A studio course in color photographic processes, including color toning and hand coloring of black and white prints, and color printing. Emphasis is on camera skill, color techniques, image content, and creative use of color photography.

262 Second-Year Photography Spring. 3 credits. Prerequisite: Art 161 or 162 or permission of instructor. Darkroom fee, $20.
Hours to be arranged. Staff.
A studio course in black and white or color photography. Emphasis is on advanced camera and darkroom skills, image content, and creative use of black and white photography.

[263 Photo Processes 3 credits. Not offered 1979–80.]

361–362 Third-Year Photography 361, fall; 362, spring. 4 credits each term. A studio course intended for photography majors and other qualified students. Prerequisite: Art 261 and 262 or permission of instructor.
361: T R 3:30–6:25. S. Bowman.
Continued study of creative use of photography with emphasis upon specialized individual projects.

461–462 Fourth-Year Photography 461, fall; 462, spring. 4 credits each term. A studio course intended for photography majors and other qualified students. Prerequisite: Art 361 and 362 or permission of instructor. Offered only for students who entered in the fall of 1977.
461: T R 3:30–6:25. S. Bowman.
Continued study of creative use of photography leading to thesis exhibition.

Studio Courses in Drawing

151–152 First-Year Drawing 151, fall; 152, spring. 3 credits each term.
151: sec 1, M W 1:25–4:25; sec 2, T R 9:05–11, plus 2 hours to be arranged; sec 3, T R 1:25–4:25.
A basic drawing course in the study of form and techniques. Contemporary and historical examples of figure drawing are analyzed in discussion.

251–252 Second-Year Drawing 251, fall; 252, spring. 3 credits each term. Prerequisites: Art 151 or 152, or permission of instructor.
251: sec 1, T R 9:05–12:05; sec 2, M W 1:25–4:25. Staff.
A continuation of Art 151, but with a closer analysis of the structure of the figure and a wider exploitation of its purely pictorial qualities.

[351 Third-Year Drawing Fall. 3 credits. Prerequisites: Art 151, 152, 251, and 252. Staff. Not offered 1979–80.]

Graduate Thesis

712 Graduate Thesis Spring. Credit as assigned.
Staff.
For graduate students in their last term in the programs in painting, sculpture, and graphics.

Special Studio Courses

270 Special Studio Fall or spring. Credit as assigned. May be repeated for credit. Permission of instructor required.
Staff.
For transfer students and others whose standing in the professional sequence is to be determined. May be in painting, sculpture, graphics or photography.

370 Studio Concentration Fall or spring. Credit as assigned. May be repeated for credit. Permission of instructor is required.
Staff.
For B.F.A. degree candidates who wish a greater concentration in drawing, painting, sculpture, graphics, or photography in the upperclass years.

470 Studio Concentration Fall or spring. Credit as assigned. May be repeated for credit. Permission of instructor required.
Staff.
For B.F.A. degree candidates who wish a greater concentration in drawing, painting, sculpture, graphics, or photography in the upperclass years.

City and Regional Planning

Most courses in the Department of City and Regional Planning are open to students in any college of the University who have fulfilled the prerequisites and have the consent of the instructor.

Course Numbers

There are two components to city and regional planning course numbers: (a) Courses numbered from 500–599 and 600–699 are generally considered to be introductory and/or first-year courses; those numbered from 700–799 and 800–899 are generally considered to be more advanced courses. Upperclass undergraduate courses are numbered from 300–499. (Undergraduates with the necessary prerequisites and permission of the instructor may enroll in courses numbered 500 and above.)
(b) Courses are grouped (by the tens digit of the course number) to represent the underlying structure of the planning curriculum as follows: theory and quantitative methods (0, 1, 2), program areas (3, 4, 5), and interprogram topics (6, 7, 8, 9).

The department attempts to offer courses according to the following schedule; however, students should check with the department at the beginning of each semester for the latest changes.

Urban and Regional Theory

400/500 Introduction to Urban and Regional Theory Spring. 4 credits. A first-year graduate course, open to juniors and seniors.
T 2:30–5:30. N. Gilgosch, W. W. Goldsmith.
A review of attempts by the various social sciences to understand the contemporary city and its problems, particularly as seen by planners. Material is drawn from urban and regional economics, human ecology, urban sociology, psychology, anthropology, and geography in order to explain the location, size, form, and functioning of cities. Traditional and contemporary critical theory is examined as it applies to physical, social, and economic problems of the modern city.

600 Urban Economic Analysis Fall. 3 credits. Prerequisite: CRP 500 or equivalent.
W 7:30–9:30 p.m. S. Czamanski.
Examination of the city as an economic entity with spatial characteristics. Urban phenomena are analyzed from an economic point of view, using tools from economic analysis. Areas examined include patterns and determinants of urbanization, urban structure and location of activities, urban land and housing markets, the role of urban transportation, and urban public policy.

708 Fieldwork/Workshop in Urban and Regional Theory Fall or spring. Credit as assigned.
Staff.
Work on problems in urban and regional theory in a field and/or laboratory setting.

709 Special Topics in Urban and Regional Theory Fall or spring. Credit as assigned.
Staff.

800 Advanced Seminar in Urban and Regional Theory I Fall. 3 credits. Prerequisite: CRP 500.
M 3:35–5:30. B. G. Jones.
The theory of urban spatial organization. Economic, technological, and social factors leading to urbanization and various kinds of spatial organizations are explored. Major theoretical contributions to the understanding of intraregional and intraurban distribution of population and economic activity are reviewed.

801 Advanced Seminar in Urban and Regional Theory II Spring. 3 credits. Prerequisite: CRP 800.
M 3:35–5:30. B. G. Jones.
A continuation of CRP 800, concentrating on recent developments.

809 Informal Study in Urban and Regional Theory Fall or spring. Credit as assigned.
Staff.

Planning Theory and Politics

510 Introduction to Planning Theory Spring. 3 credits.
T 1:25–3:20. P. Clavel.
Normative and behavioral models of decision making for the provision of public goods and services. Theories of individual decision and choice are reviewed, followed by applications in institutional contexts stressing the impact of alternative organizational and political models of social decision processes.

511 Introduction to Planning Fall. 4 credits.
M W F 10:10–11. P. Clavel.
The origins, history, programs, and contemporary issues of city and regional planning in the United States. Conceptions of the state, the role of planners in public action, and the dominant methods and values of planners are discussed and criticized.

612 Urban Politics and Planning Spring. 3 credits.
I. R. Stewart.
A consideration of the political dimension of planning and renewal activities. Emphasis on government mandate and structure, as well as interest group and power relationships as they are related to development decision-making processes. Theory and case-study analyses.

614 Neighborhood and Community Theory Spring. 4 credits.
M 12:20–3:20. N. Gilgosch.
An examination of contemporary social and economic conditions of neighborhoods; community differentiation reinvestment and revitalization policies and practice; community control; and the role of the community in the provision of goods, services, and social support.

710 Politics of the Planning Process Spring. 4 credits.
W 2:30–4:25. P. Clavel.
Analysis of planning and political institutions in selected subjects and policy areas, relating national and subnational levels. Subjects are drawn from such areas as environmental control and use policy, industrial development, transportation, and community development. Theories of planning and politics are compared for their analytical usefulness in these areas.

[711 Planning and Organization Theory Fall. 4 credits. Not offered 1979–80.
T 1:25–3:20. P. Clavel.
A seminar examining organizational and administrative models relevant to plan formation and implementation. Applications are made to such programs as community development, regional administration, urban renewal, and land-use control.]

718 Fieldwork/Workshop in Planning Theory and Politics Fall or spring. Credit as assigned.
Staff.
Work on problems in planning theory and politics in a field and/or laboratory setting.

719 Special Topics in Planning Theory and Politics Fall or spring. Credit as assigned.
Staff.

810 Advanced Planning Theory Fall. 3 credits. Prerequisite: CRP 500 or 710.
F 3:35–5:30. B. G. Jones.
A survey of the works of scholars who have contributed to current thinking about planning theory. Alternative assumptions concerning models of man and theoretical concepts concerning the nature of planning today are considered.

819 Informal Study in Planning Theory and Politics Fall or spring. Credit as assigned.
Staff.

Quantitative Methods and Systems Analysis

320 Introduction to Quantitative Methods I Fall. 3 credits. Prerequisite: Mathematics 108 or equivalent, or permission of instructor.
Staff.
An introduction to the application of quantitative methods to issues in urban and regional studies. Special attention is given to the characterizations, evaluations, and control of evolving processes of urban and regional issues. Emphasis is on methods for the description of physical and social phenomena by mathematical means. Topics include linear and non-linear deterministic processes, elementary stochastic process, process identification, and simulation.

321 Introduction to Quantitative Methods II Spring. 3 credits. Prerequisite: CRP 320, or permission of instructor.
Staff.
Methods for the evaluation and control of process performance. Topics include linear and dynamic programming, single stage and multistage decisions, and elementary statistical decision theory.

520 Mathematical Concepts for Planning Fall. 1, 2, 3, or 4 credits. Prerequisite: permission of instructor.
M W 2:30–4:25. Staff.
Intended for students having little or no background in college mathematics. Basic concepts in matrix algebra, calculus, and probability are covered in self-contained units of one credit each. Students may register for any or all of these topics.

Mathematics 201, Mathematics for the Social Sciences, and Sociology 420, Mathematics for Sociologists, are acceptable substitutes.

521 Introduction to Computers in Planning Fall. 3 credits.
T R 11:15–12:05; lab R 3:45–4:25. P. Brandford.
An introduction to the use of computers in the problem-solving and planning processes. Students run programs using PL/1 or another appropriate programming language. Brief introduction to

computer systems and the use of library routines. Advantages and limitations of using computers are considered.

620 Planning Analysis Spring. 4 credits. Prerequisite: CRP 621.
M W F 10:10–11:00; lab T 2:30–4:25. B. G. Jones.
A survey of commonly used techniques for analyzing various aspects of subnational socioeconomic systems emphasizing planning applications.

621 Statistical Analysis for Planning Spring. 3 credits. Prerequisites: CRP 520 or equivalent and permission of instructor.
T R 9:05–9:55; lab T 4:30–5:30. Staff.
An introduction to basic methods of statistical analysis with an emphasis on their use in the decision-making process in planning. Material in decision theory, sampling, estimation, hypothesis testing, and prediction will be introduced.

622 Planning Information Systems Fall. 3 credits. Prerequisite: CRP 521 or equivalent.
T R 3:35–4:25; lab to be arranged. G. Ziegler.
The design and use of computer-based information systems for planning and policy analysis, including conventional data processing and advanced data base systems. Technical aspects in the design and structure of such information systems are introduced along with a variety of applications.

623 Methods of Social Policy Planning Spring. 3 credits. Prerequisite: CRP 521 or equivalent.
R 12:20–2:15. N. Gilgosch.
An examination of methodologies of needs assessment, programming, and evaluation suitable for social planning problems. Many of the methodologies, survey research, social area analysis, and social indicators have been drawn from other social science disciplines but are applied to policy and planning issues. Others, such as needs assessment, social impact assessment, goal attainment, PPBS, and PERT were developed directly or were adapted for use in social planning.

720 Quantitative Techniques for Policy Analysis and Program Management Fall. 4 credits.
M W 10:10–12:05; lab, W 1:25–3:20. D. Lewis.
Selected analytical techniques used in the planning and evaluation of public policy and public investments are examined. Topics include simulation modeling, benefit-cost and cost effectiveness analysis (including capital budgeting), and optimization strategies.

721 Simulation in Planning and Policy Analysis Fall or spring. 3 credits. Prerequisites: CRP 621 and 521 or equivalent.
T R 4:40–5:30. S. Saltzman.
The design and use of simulation models in planning and policy analysis. Various approaches drawn from discrete stochastic simulation, econometric simulation, microanalytic simulation, and urban dynamics are evaluated. Applications in design, land use, regional development, and social policy will be considered. Students run their own programs on the Cornell computer.

722 Decision Analysis for Policy Planning and Program Management Spring. 4 credits.
M W F 9:05–9:55; lab, W 12:20–2:15. D. Lewis.
An examination of selected techniques for analyzing complex dynamic decision problems in the planning context. Topics include dynamic programming (deterministic and probabilistic), integer programming, and process simulation (queueing models).

728 Fieldwork/Workshop in Systems Planning and Analysis Fall or spring. Credit as assigned.
Staff.
Work on applied systems planning problems in a field and/or laboratory setting.

729 Special Topics in Quantitative Methods and Analysis Fall or spring. Credit as assigned.
Staff.

820 Seminar in Methods for Planning and Policy Analysis Fall or spring. 3 credits. Prerequisite: permission of instructor.
Staff.
A review and critical analysis of various analytical and computer methods of actual and potential use in planning and in the analysis of public policy. The material covered varies, depending upon the interests of the members of the seminar.

829 Informal Studies in Quantitative Methods and Analysis Fall or spring. Credit as assigned.
Staff.

Regional Development Planning

430 Regional Economic Development Fall. 4 credits. Prerequisite: CRP 500.
Staff.
Problems of and theories about development of lagging, underdeveloped, or poor regions in industrial nations, with emphasis on planning implementation.

530 Introduction to Regional Development Planning Fall. 3 credits. Prerequisite: CRP 500.
Staff.
An introduction to the history, theories, methods, and processes of regional development planning. Will also focus on planning for specialized functions in various public agencies.

630 Regional Development Administration Fall or spring. 4 credits.
M 1:25–3:20. P. Clavel.
Administrative institutions relevant to regional development policies, with attention to the United States, Western Europe, and Third World countries. Approaches to theory, measurement, and spatial distribution of institutions are covered with reference to the design of effective programs.

730 Regional Planning Methods Fall. 4 credits. Prerequisites: CRP 620, basic economics, some calculus, and statistics.
T 7:30–9:30 p.m. S. Czamanski.
Problems in the formulation and testing of scientific hypotheses. Focus is on depressed or underdeveloped regions; also includes some discussion of past and current work of participants and their dissertations. Topics include construction of models, main estimating techniques, and some applied regional models.

738 Fieldwork/Workshop in Regional Development Planning Fall or spring. Credit as assigned.
Staff.
Work on applied problems in regional development planning in a field and/or laboratory setting.

739 Special Topics in Regional Development Planning Fall or spring. Credit as assigned.
Staff.

830 Seminar in Regional Interindustry Analysis and Programming Spring. 4 credits. Prerequisites: basic economics and elementary matrix algebra.
M 7:30–9:30 p.m. S. Czamanski.
Advanced treatment of regional industrial structure, methods of construction and applications of input-output, linear programming, saturation, and dynamic optimization. Examples of recent applications of the techniques discussed to the solution of actual regional problems will be analyzed.

831 Techniques of Regional Accounting Fall or spring. 3 credits. Prerequisites: CRP 620 and Economics 312 or equivalent.
Staff.
Methods of construction of the regional social accounts and their application to regional planning. Measuring levels of activity within regions, such as income and product accounts, is emphasized. Methods of estimating flows between regions, such as balance of payment accounts, are also considered.

832 Location Theory Fall or spring. 3 credits. Prerequisites: CRP 500 and 620, and Economics 311–312, or equivalent.
R 1:30–3:30. W. Isard.
Traditional Weberian location doctrine; transport orientation, labor orientation, agglomeration, and urban rent theory are examined. Interregional trade and market and supply area analysis is treated. Particular attention is paid to Loschian and Christaller systems of urban places.

833 Methods of Regional Analysis Spring. 3 credits.
R 1:25–4:25. W. Isard.
Advanced applications of interregional and regional input-output and linear programming techniques to development problems. Applications of spatial interaction and growth (intertemporal) models to the analysis of urban and multiregional systems, with particular reference to environmental quality management.

839 Informal Study in Regional Development Planning Fall or spring. Credit as assigned.
Staff.

Social Policy Planning

340 Social and Political Studies of Science (also Sociology 355) Spring. 3 credits.
W 2:30–4:30. D. Nelkin, S. Del Sesto.
A view of science less as an autonomous activity than as a social and political institution. Focus is on its relationship to government, the media, religion, and education. Drawing from recent controversies, questions of ethics and social responsibility in science, struggles to maintain internal control over research and the teaching of science, and concepts of limits to inquiry are discussed.

440 The Impact and Control of Technological Change (also Economics 302 and Government 302; cosponsored by the Program on Science, Technology, and Society) Spring. 4 credits.
T R 2:30–4:25. R. Brickman and guest lecturers.
Social, environmental, and economic implications of technological change in the context of present policies and strategies of control. Several specific cases are considered in detail, followed by investigation of the problems of a modern technological society. Alternative political and economic solutions are explored.

[540 Introduction to Social Policy Planning Fall. 4 credits. Not offered 1979–80.
T 12:20–3:20. N. Gilgosch.
The process and politics of providing public services, primarily social services, within the context of changing fiscal and social conditions. Topics include (1) a review of the nature and source of selected social problems and of the present service systems which attempt to meet these needs; (2) an analysis of the inadequacies and problems of this system in the light of changing conditions which affect service delivery, such as fiscal and service disparities, budget retrenchment, and political movements to limit spending such as Proposition 13; and (3) an exploration of new forms or alternatives to the existing service delivery systems.]

541 The Politics of Technical Decisions I (also Government 628 and B&PA NPA 515); cosponsored by the Program on Science, Technology, and Society) Fall. 4 credits.
W 2:30–4:25. D. Nelkin, S. Del Sesto.
Political aspects of decision making in areas

traditionally regarded as technical. Subjects include the origins and characteristics of "technical politics," the role of experts in government, and the problem of expertise in a democratic system. Alternatives to current decision-making procedures are explored.

542 The Politics of Technical Decisions II (also Government 629 and B&PA NPA 516; cosponsored by the Program on Science, Technology, and Society) Spring. 4 credits. Prerequisite: CRP 541 or permission of instructors.
Hours to be arranged. D. Nelkin.
A continuation of CRP 541, focusing on decision making in several technical policy areas. Students develop individual or group research projects focusing on policy decisions with a significant technical component and considerable public impact.

543 Planning, Organizing, and Public Service Delivery Fall or spring. Credit as assigned.
J. Forester.
An exploration of planners' roles and practices with special attention to organizational and political contexts of planning and policy analysis efforts. Focus is on communicative dimensions of organizational behavior and planning practice; planning is assessed as an organizing activity extending far beyond technical problem-solving.

544 Recurring Themes in Social Policy Planning Spring. Credit as assigned.
J. Forester.
A seminar devoted to the understanding of problems of social policy planners. Recurring social policy themes are studied: professional power and dependency-creation, political and technical aspects of expertise, organizational and institutional settings of social policy programs and services, problems of professional altruism. Work of Titmuss, Lubove, Goffman, and Illich is discussed.

[640 Critical Social Theory in Planning Fall. 4 credits. Limited to seniors and graduate students. Intended for students already familiar with "radical" social theory. Prerequisite: permission of instructor. Not offered 1979–80.
F 2:30–4:25. W. Goldsmith.
A review of Marxist methods and analysis of controversies in critical theory: problems of capital accumulation, the role of the state, the role of the intellectual, and alternative paths to socialism, focusing on the industrialized West.]

642 Critical Theory and the Foundations of Planning Analysis Fall. Credit as assigned.
J. Forester.
Beginning with Weber, Marx, and Durkheim, the fundamental assumptions, theories, and frameworks structuring planning and policy analyses are explored. Positivistic, phenomenological, ordinary language, and critical perspectives are considered as they clarify or obscure questions of value, rationality, objectivity, interpretation, and action in public policy contexts.

740 Seminar in Social Policy Research and Analysis Spring. 4 credits.
Staff.
The focus is on examining contemporary methods of social policy analysis, including their political implications, and developing multidisciplinary approaches to selected social policy issues. The dilemmas of action research and of implementing research findings are explored.

744 Urban Financial Planning and Management Spring. 3 credits.
R. Schramm.
Introduction to the theory and practice of financial management and planning in urban government, including budgeting, capital expenditures, management of short-term assets, borrowing, taxation, and intergovernmental finance. Case studies and problem sets that place the student in a decision-making context are emphasized.

[745 Urban Fiscal Analysis Fall. 3 credits. Prerequisite: CRP 744 or a course in public finance. Not offered 1979–80.
W 2:30–4:25. R. Schramm.
Government financial information (fund accounting, financial statements, and budgets) is introduced and this information and other data are used to identify major fiscal problems and their causes faced by cities. Alternative solutions to urban fiscal problems are evaluated using this analysis.]

746 Informal Seminar in Planning Theory: Philosophy, Ethics, and Values in Planning Fall or spring. Credit as assigned.
J. Forester.
An informal seminar to discuss problems of values, ethics, and alternative philosophical positions that are inherent in various planning proposals or perspectives. Can planning be ethical (the claims of incrementalists to the contrary)? Must value judgments be arbitrary?

747 Seminar on Jurgen Habermas and the Analysis of Public Policy Spring. Credit as assigned.
J. Forester.
An advanced seminar to discuss and ground Habermas's theory of systematically distorted communication in the context of planning and public policy analysis. Themes include: communicative action, limits of instrumental rationality, critique of ideology and analysis of distortions of communication, relationship of critical theory to practices, and praxis, necessary interestedness of inquiry.

748 Fieldwork/Workshop in Social Policy Planning Fall or spring. Credit as assigned.
Staff.
Work on applied problems in social policy planning in a field and/or laboratory setting.

749 Special Topics in Social Policy Planning Fall or spring. Credit as assigned.
Staff.

849 Informal Study in Social Policy Planning Fall or spring. Credit as assigned.
Staff.

Urban Development Planning

551 Suburbanization and Metropolitan America Fall. 3 credits. Prerequisite: permission of instructor.
I. R. Stewart.
The major issues in suburban development, metropolitan growth analysis, and the role of new communities in accommodating expected future population.

552 Urban Land-use Planning I Spring. 3 credits.
T 12:20–2:15. S. Stein.
Surveys, analyses, and plan-making techniques for guiding physical expansion and renewal of urban areas; location requirements, space needs, interrelationships of land uses. Emphasis on residential, commercial, and industrial activities and community facilities; housing and neighborhood conditions. Lectures, seminars, and field exercises.

[553 Urban Land-use Planning II Spring. 2 credits. Prerequisite: CRP 552 or permission of instructor. Not offered 1979–80.
F 11:15–1:10. S. Stein.
Consideration in-depth of neighborhoods, central business districts, shorelines and waterfronts, new towns, planned-unit developments, high-density housing, highway-oriented uses, and others.]

554 Introduction to Environmental Planning Design Fall. 3 credits. Intended for graduate planning students without design backgrounds. Prerequisite for other students: permission of instructors.
M W 11:15–1:10. K. Grey, S. Stein.
Planning and design of built environments as an aesthetic reflection of comparative values and needs. Lectures, seminars, readings, and design exercises explore basic concepts and issues related to architecture, landscape, urban design, and urban planning.

555 Environmental Planning and Design Workshop Spring. 4 credits. Prerequisite: CRP 554 or permission of instructor. No previous graphics experience required.
M W 11:15–1:10, plus studio work. K. Grey.
Planning and design problems related to the built environment. An understanding of the design process is developed and graphic communication techniques explored.

556 Built-Environment Education Workshop Fall and spring. 4 credits.
Lecs and seminars, W 7:30–9:30 p.m. S. Stein.
Interdisciplinary teams of students from the environmental design disciplines and historic preservation program work in elementary and junior high school classrooms with school children and teachers to deepen their understanding of the impact of the built environment on their lives, and encourage their participation in the shaping of their own environment. Working in classrooms is emphasized.

[651 Urban Land Policy and Programs Fall. 3 credits. Prerequisite: 653 or permission of instructor. Not offered 1979–80.
M 1:25–3:15. J. W. Reps.
Major problems of urban land control and management and possible solutions are considered. Subjects for discussion include taxation, compensation and betterment, large-scale public land acquisition, subsidies and incentives, and acquisition of developmental rights.]

652 The Urban Development Process Spring. 2 credits. Prerequisite: CRP 511 or permission of instructor. Enrollment limited. May not be offered 1979–80.
M 3:35–5:30. Staff.
Examination of the goals, strategies, methods, and achievements of major participants in the urban land and building market: land owners, speculators, real estate brokers, developers, bankers, lawyers, nonprofit builders, and government agencies.

653 Legal Aspects of Land-use Planning Spring. 3 credits. Prerequisite: CRP 511 or permission of instructor.
R 12:20–2:15. Staff.
Survey of leading cases and legal concepts in land-use planning, with particular attention to zoning, subdivision control, condemnation, and growth control issues.

[655 Seminar in Urban Design Fall. 3 credits. Not offered 1979–80.
S. Stein.
Investigation of historical and current thought on the visual aspects of cities, including evaluation of technological and cultural influences on urban design, perception of urban form, and relationships between the contemporary city planning process and visual form in cities.]

656 Critical Areas Protection Fall. 3 credits.
M W F 9:05–9:55. R. Booth.
State government attempts to protect critical areas such as tidal wetlands, key agricultural lands, and flood plains with planning and regulatory techniques. Analysis of significant management, implementation, and legal issues.

657 Planning and Development Workshop Fall or spring. 4 credits.
Staff.

658 Regulation of Projects of State Concern Spring. 3 credits.
R. Booth.

State government attempts to regulate the planning and development of projects deemed to be of statewide concern, such as key power generation and transmission facilities and large industrial development. Analysis of significant management, implementation, and legal issues.

750 Urban Land Policy and Programs — Special Problems Fall or spring. Credit as assigned.
Staff.

[751 Professional Practice Seminar Spring. 2 credits. Not offered 1979–80.
S. Stein.
Exploration of various aspects of urban planning practice in both the public and private sectors, including the roles and careers for professional planners; the planning function within the structure of government; consulting; funding and budgets; professional societies; professional ethics; related professionals; and other topics.]

758 Fieldwork/Workshop in Urban Development Planning Fall or spring. Credit as assigned.
Staff.
Work on applied problems in urban development planning in a field and/or laboratory setting.

759 Special Topics in Urban Development Planning Fall or spring. Credit as assigned.
Staff.

859 Informal Study in Urban Development Planning Fall or spring. Credit as assigned.
Staff.

Special Interprogram Topics: History and Preservation

[460 Introduction to the History of Urban Planning (also Architecture 343) Fall. 3 credits. Not offered 1979–80.
T R 9:05–9:55; lab, W 2:30–3:20. Staff.
Survey of urban planning in Western civilization, from the Greeks and Romans through medieval, Renaissance, and modern Europe, to colonial and nineteenth-century America.]

461 Methods of Archival Research (also Architecture 542) Spring. 3 credits.
T 10:10–12:05. K. C. Parsons.
Examination of methods of using archival materials, including those documents in the Cornell Archives and Regional History collection, for research in the history of architecture, historic preservation, and urban development.

560 Documentation for Preservation Planning (also Architecture 546) Fall or spring. 2 credits.
R 2:30–4:25. Staff and visiting lecturers.
Methods of collecting, recording, processing, and analyzing architectural and cultural survey materials.

561 Historic Preservation Planning Workshop: Surveys and Analyses Fall and spring. 4 credits.
R 3:30–5:30. S. Stein, T. Werbizky.
Techniques for the preparation of surveys of historic structures and districts; identification of American architectural styles focusing on upstate New York; explorations of local historical resources, funding sources, and organizational structures. Lectures and training sessions. Emphasis on fieldwork with individuals and community organizations.

562 Design and Conservation Fall. 2 credits.
R 2:30–4:25. B. G. Jones.
The rationale for and methods of using existing cultural and aesthetic resources in the planning and design of regions and cities.

660 Seminar in the History of American City Planning Fall or spring. 3 credits. Prerequisites: CRP 460, Architecture 343, or permission of instructor. May not be offered 1979–80.
Staff.

661 Historic Preservation Planning Workshop: Plans and Programs Fall and spring. Variable credit. Prerequisite: CRP 561.
R 3:30–5:30. S. Stein, T. Werbizky.
Preparation of elements of historic preservation plans, designs, legislation, and special studies. Individual or group projects are selected by students; Fieldwork is emphasized.

662 Seminar in American Urban History Spring. 3 credits. Prerequisite: permission of instructor.
I. R. Stewart.
Seminar in the historical evolution of the American city. Emphasis on factors in urban growth, the process of urbanization, urban reform movement, and intellectual and social responses to the city.

663 Historic Preservation Law Spring. 2 credits. Offered alternate years.
M W 11:15–12:05. R. Booth.
Law of historic district and landmark designation; tools for preservation (such as police power, taxation, eminent domain); recent developments in state and federal historic preservation mandates.

664 Economics and Financing of Neighborhood Conservation and Preservation Fall. 2 credits.
B. G. Jones.
The economic and financial aspects of historic preservation and neighborhood conservation. Topics include public finance, selected issues in urban economics, real estate economics, and private financing of real estate projects.

768 Fieldwork/Workshop in History and Preservation Fall or spring. Credit as assigned.
Staff.
Work on applied problems in history and preservation planning in a field and/or laboratory setting.

769 Special Topics in History and Preservation Fall or spring. Credit as assigned.
Staff.

869 Informal Study in History and Preservation Fall or spring. Credit as assigned.
Staff.

Special Interprogram Topics: International Studies

670 Regional Planning and Development in Developing Nations Fall. 4 credits. Prerequisite: second-year graduate standing.
F 2:30–4:25. W. W. Goldsmith.
Extensive case studies of development planning are analyzed. Focus is on a Marxist critique of the process of regional development through urbanization and in particular the concepts of equity and efficiency, external economies, export linkages, and internal self-sufficiency and integration. Resource development, national integration, human development, and migration problems are discussed.

671 Seminar in International Planning Spring. 1 credit. S-U grades only.
F 12:20–1:30. W. W. Goldsmith.
The International Planning Lecture Series sponsors lectures by visiting scholars or professionals in the field of international development and planning. The only formal requirement for the course is a brief evaluation of the series at the end of the semester.

771 Seminar in Science and Technology Policy in Developing Nations Spring. 3 credits.
D. Lewis.
An examination of the issues facing developing countries as they endeavor to use technology in pursuit of their national goals. Topics covered include alternative choices of technology and the associated impacts, the role of multinational corporations, government policymaking institutions, manpower development and utilization strategies, and policy instruments.

772 Seminar in Policy Planning in Developing Nations: Technology Transfer and Adaption Fall. 3 credits.
F 10:10–12:05. D. Lewis.
An exploration of the international transfer of technology to developing nations and the policies used to guide this process. Topics covered include the role of foreign aid and multinational corporations, economic rationale for choice of appropriate technology, and social benefit-cost analysis. Case studies are emphasized.

773 Seminar in Project Planning in Developing Countries Spring. 3 credits.
M 1:25–3:20. D. Lewis.
An examination of the problems and issues involved in the process of planning and implementing development projects in developing countries. The role of the planner is explored from several different disciplinary points of view through a series of case studies selected from agriculture, industry, rural development, and urban planning. Countries typically represented include: Egypt, Ethiopia, India, Jordan, Korea, Mexico, Nepal, and the Commonwealth of Puerto Rico.

777 Theories of Development and Underdevelopment Fall. 4 credits. Prerequisite: familiarity with Marxist theory.
R 2:30–4:25. W. W. Goldsmith.
An exploration of current debates regarding the problem of articulation of the world economy and peripheral regions.

778 Fieldwork/Workshop in Planning for Developing Regions Fall or spring. Credit as assigned.
Staff.
Work on applied problems in planning for developing regions in a field and/or laboratory setting.

779 Special Topics in Planning for Developing Regions Fall or spring. Credit as assigned.
Staff.

879 Informal Studies in Planning for Developing Regions Fall or spring. Credit as assigned.
Staff.

Special Interprogram Topics: Environmental Health, Housing, and Institutional Planning

480 Environmental Issues and Public Decisions Fall. 3 credits.
R. Booth.
An examination of public decisions affecting environmental quality, including the pressures that require decisions on environmental issues; the methods of influencing those decisions; the decision makers; the criteria and rationale for the decisions; and the environmental, social, political, and economic impacts.

[580 Introduction to Planning Instituitions Fall. 3 credits. Not offered 1979–80.
P. Clavel.
A survey of contemporary organizational forms and political forces facilitating and inhibiting the development of the planning profession at the city, state, and regional levels. The focus is on subnational planning in the United States, but the national context and other nations are dealt with where appropriate.]

[581 Seminar in Housing and Urban Development Fall. 3 credits. Not offered 1979–80.
I. R. Stewart.
An introductory review of the evolution of governmental policy and programs in the areas of housing, urban renewal, and development. Both theory and case-study analyses of recent American experience in these fields are used.]

[**582 Administrative Planning** Spring. 3 credits. Prerequisite: permission of instructor. Not offered 1979–80.
K. C. Parsons.
An analysis of interactive elements in the planning process for colleges and universities. Topics include organizational and administrative theory, management objectives, evaluation, accountability-quantity and quality budgeting, and program planning. Governmental constraints are stressed.]

585 Introduction to Environmental Health Issues Spring. 3 credits.
F 2:30–4:25. B. G. Jones.
An examination of concepts and issues in environmental health, particularly as they relate to planning for health and medical care delivery systems, economic development, and other policy issues.

685 Environmental Epidemiology Spring. 3 credits. Prerequisite: CRP 520.
W F 11:15–12:05. P. Brandford.
Introduction to epidemiological methods. Emphasis is on the detection of changes in health status associated with changes in environmental conditions and the significance of these findings for environmental health planning.

686 Environmental Law, Policy, and Management Fall. 3 credits.
M W F 11:15–12:05. R. Booth.
Examination of selected environmental law topics from a policy management standpoint. Topics include environmental impact statement preparation and analysis, pollution control laws, and government regulatory procedures.

687 Environmental Management Workshop Spring. 3 credits.
M W F 9:05. R. Booth.
Research and analysis of environmental management topics of current interest at the state or local government level. Fieldwork emphasized in order to produce reports, recommendations, and/or draft legislation that contributes to solving current issues.

[**784 The Political Economy of Health Planning** Spring. 3 credits. Not offered 1979–80.
R 11:15–1:45. S. Kelman.
Lectures, reading, and fieldwork and theoretical and practical materials are combined to develop operating skills in health planning. The critical focus is on (1) the social determinants of illness, (2) the engineering model of medicine, (3) the commodity form of medical care, and (4) the prevailing economic definition of health. These topics together comprise the social context in which health planning takes place. After an intensive institutional introduction to health planning legislation, organizations, and practices, participants in the course work in one of four health planning research projects conducted in the surrounding area. Contact with local and regional organizations in and out of health planning is included.]

785 Planning and Evaluation of Environmental Health Programs and Projects Spring. 3 credits. Prerequisite: second-year graduate standing.
P. Brandford.
An examination of the use of quantitative methods and economic analysis as aids to social decision making for action in the area of environmental health. Applications of these methods to the study of particular problems of environmental health.

786 Environmental Health Planning Fall. 2 credits. Prerequisite: second-year graduate standing.
F 11:15–1:10. P. Brandford.
Introduction to concepts and issues in environmental health planning. Topics covered include the planning problems involved in the control of water quality, liquid and solid waste disposal, air quality, and housing quality.

[**787 Health Systems Planning** Fall. 3 credits. Not offered 1979–80.
T R 9:05–9:55. Staff and guest lecturers.
Issues, institutions, politics, economics, and social elements involved in the planning and administration of health problems. Special emphasis is on planning techniques and methodologies.]

788 Fieldwork/Workshop in City and Regional Planning Fall or spring. Credit as assigned.
Staff.
Work on applied planning problems in a field and/or laboratory setting.

789 Special Topics in City and Regional Planning Fall or spring. Credit as assigned.
Staff.

790 Professional Planning Colloquium I Fall. 1 credit.
Staff.

791 Professional Planning Colloquium II Spring. 1 credit.
Staff.

792 Master's Thesis, Project, or Research Paper I Fall. Credit as assigned.
Staff.

793 Master's Thesis, Project, or Research Paper II Spring. Credit as assigned.
Staff.

794 Planning Internships Fall, spring, summer. 1–4 credits.
Staff.
Combines a professional planning internship in a metropolitan area with academic study in order to gain experience and understanding of the planner's role in formulating and implementing plans and policies. Salaried internships in federal or state agencies, legislative offices, and comparable settings includes development of research, analysis, and other technical skills. Weekly seminar draws on student field experiences, assigned readings, and guest speakers to examine current issues of federal, urban, and regional policy from the perspective of planning practice.

888 Informal Studies in Environmental Health Planning Fall or spring. Credit as assigned.
Staff.

889 Informal Studies in City and Regional Planning Fall or spring. Credit as assigned.
Staff.

890 Planning Research Seminar I Fall. 1 credit. Intended for doctoral candidates in city and regional planning; other students welcome.
Staff.
Presentation and discussion of current problem areas and research by advanced doctoral students, faculty, and visitors.

891 Planning Research Seminar II Spring. 1 credit.
Staff.

892 Doctoral Dissertation I Fall. Credit as assigned.
Staff.

893 Doctoral Dissertation II Spring. Credit as assigned.
Staff.

Landscape Architecture

The Landscape Architecture Program at Cornell is sponsored by the College of Agriculture and Life Sciences (in association with the Department of Floriculture and Ornamental Horticulture) and the College of Architecture, Art, and Planning.

Landscape Architectural Design

Sequence Courses

***201 (231) Design I: Basic Landscape Architectural Design** Fall. 5 credits.
T. H. Johnson.

***202 (232) Design II: Basic Landscape Architectural Design** Spring. 5 credits.
M. I. Adleman.

***301 (331) Design III: Intermediate Landscape Architectural Design** Fall. 5 credits.
P. J. Trowbridge.

***302 (332) Design IV: Intermediate Landscape Architectural Design** Spring. 5 credits.
T. H. Johnson.

***401 (431) Design V: Advanced Landscape Architectural Design** Fall. 4 credits.
M. I. Adleman.

***402 (432) Design VI: Advanced Landscape Architectural Design** Spring. 5 credits.
P. J. Trowbridge.

501 (581) Graduate Landscape Architecture Design Studio Fall. 5 credits. Open to graduate students in landscape architecture, architecture, city and regional planning, and fifth-year architecture students.
Lec and studio, M W 1:25–4:25. L. J. Mirin.
Analysis, planning, and design response to problems of environmental impact. Traditional and advanced techniques of landscape architecture are applied to study natural and cultural systems and processes.

***502 Graduate Landscape Architecture Design Studio** Spring. 5 credits.
T. J. Johnson.

601 Graduate Landscape Architecture Design Studio Fall. 5 credits.
Lec and studio, M W 1:25–4:25. L. J. Mirin.

800 (889) Thesis Research and Preparation in Landscape Architecture Fall or spring. Credit to be arranged. Limited to candidates for Master of Landscape Architecture degree. Prerequisite: permission of the graduate field members concerned.
Hours to be arranged. Staff.

Landscape Materials and Construction

***310 (242) Site Construction I** Spring. 4 credits.
P. J. Trowbridge.

***311 (341) Site Construction II** Fall. 4 credits.
T. H. Johnson.

Related Courses in Other Departments

Woody Plant Materials of Landscape Use (Floriculture 213)

Drawing for Landscape Architects (Floriculture 109)

Perspective for Landscape Architects (Floriculture 110)

Landscape Architecture Principles, Theory, and History

***220 (211) Principles of Landscape Architecture**
Fall. 2 credits.
P. J. Trowbridge.

***221 (212) Principles of Landscape Architecture**
Fall. 1 credit.
Discussion to be arranged. P. J. Trowbridge.

***425 (491) Plants and Design** Fall. 2 credits.
M. L. Adleman.

520 (481) Contemporary Issues in Landscape Architecture Fall. 2 credits.
Lec, F 11:15. L. J. Mirin.
Recent technological, methodological, and legislative developments are assessed in terms of their probable impact on the practice of landscape architecture.

521 (585) History of Landscape Architecture I
Fall. 3 credits.
Lec, T R 11:15; discussion to be arranged.
L. J. Mirin.
The landscape architectural tradition, from classical times to the present, is examined as a reflection of the diverse influences that have generated physical modifications of outdoor space. Recognition of the principles and techniques inherent in noted examples of the altered environment is emphasized.

522 History of Landscape Architecture II Spring. 3 credits.
Lec, T R 11:15. L. J. Mirin.
Development of landscape architectural design in the United States from the time of Jefferson to the present is examined as a unique expression of the American experience. Influences exerted by factors such as the physical landscape, the frontier and utopian spirit, and the cultural attitudes and assumptions of democracy and capitalism are traced as they affect the forms of urban parks, private and corporate estates, suburban and public housing, transportation planning, national parks, and other aspects of open-space design in which landscape architects have made significant contributions.

***622 Graduate Seminar in Landscape Architecture** Spring. 2 credits.
T. J. Johnson.

Landscape Planning

***431 Introduction to Parks and Recreation** Fall. 2 credits.
E. J. Carter.

***432 Issues in Parks and Recreation** Spring. 2 credits.
E. J. Carter.

530 (583) Urban Landscape Planning and Design Spring. 3 credits.
Lec, discussion, and field trips to be arranged.
L. J. Mirin.
The principles and techniques of landscape architectural development and conservation of urban open space. Areas studied include arboriculture, street graphics, recreation, design controls, and public space and housing.

***531 (572) Regional Landscape Inventories and Information Systems: An International Perspective** Fall. 3 credits.
A. S. Lieberman.

***532 (573) Analysis and Use of Vegetation in Comprehensive Land Planning** Spring. 3 credits.
A. S. Lieberman.

Landscape Industry

***140 (102) Introduction to Landscape Design**
Fall or spring. 3 credits.
R. W. Dwelle.

***340 (201) Landscape Design for Nurserymen or Landscape Contractors** Fall or spring. 3 credits.
D. W. Dwelle.

Independent Study

***555 Independent Study in Landscape Architecture** Fall or spring. 1–3 credits as assigned.
Staff.

621 Summer Internship Seminar Fall. 2 credits.
Hours to be arranged. L. J. Mirin.
Presentation and discussion of projects developed during summer internships.

650 Fieldwork/Workshop in Landscape Architecture Fall or spring. Variable credit.
Hours to be arranged. Staff.
Work on applied problems, under faculty supervision, in landscape architecture in a field and/or studio setting.

*Offered through the College of Agriculture and Life Sciences

College of Arts and Sciences

Anthropology

Anthropology courses with numbers below 500 do not have prerequisites unless specifically given in the course descriptions.

I. Introductory Courses (including Freshman Seminars)

101 Introduction to Anthropology: The Evolutionary Perspective Fall. 4 credits.
M W F 11:15. K. A. R. Kennedy.
A survey of the processes and history of man's evolution. The mechanisms of evolutionary change and adaptation to the environment are examined from the standpoint of both archaeology and human biology.

102 Introduction to Anthropology: The Cultural Perspective Spring. 4 credits.
M W F 11:15. B. J. Isbell.
Cultural anthropology is the study of the cultural diversity of our species. What are the norms and extremes of ways of life of human communities? What is the human common denominator? What are the key differences between humans and nonhumans?

111 Cornell as Subject: The University as a Problem in Social Science Fall. 3 credits.
Freshman Seminar.
T R 12:20–1:35. R. A. Scott.
"College life" is usually considered synonymous with "student social life," but in this seminar the term is examined as a problem in ethnography and as a general reference for several topics: students, faculty, administrators, college organization and structure; academic decision making; local language customs; institutional symbols, rituals, and community expression; and curriculum. Social science research and novels about Cornell provide the readings. Observation, interviews, journals, and class reports by native and foreign informants are also used.

150 The Discovery of America Fall. 3 credits.
Freshman Seminar.
R 2:30–4:25. J. C. Leon.
The discovery of the New World, beginning with American Indian origins in Asia and ending with the intellectual discovery by European adventurers, chroniclers, and travelers. Special attention is given to Norse exploration and settlement in the North Atlantic, the first Spanish encounters with the American land and people, and the exchange of flora and fauna.

205 Ethnographic Films Fall. 2 credits.
W 7:30–9 p.m. A. T. Kirsch.
Human cultural and social variability is explored through a series of ethnographic films, and readings and lectures relating to these films. The films are chosen to show peoples living in a variety of ecological situations and at different levels of social complexity in various parts of the world. Readings and lectures use the concepts and theories of cultural anthropology to interpret the significance of the different modes of life shown in the films.

II. Courses Intended Primarily for Majors

300 The Discipline of Anthropology Fall. 4 credits. Limited to and required of anthropology majors, who must take this course during the junior year.
T R 2:30–3:45. R. Ascher with the anthropology faculty.
An overview of the field of anthropology: a systematic treatment of the discipline, the concepts that are used, the persistent questions that are asked, the specializations within the field, and the shared goals and differing viewpoints. This course will help the student plan course work in anthropology.

491 Honors Thesis Fall. 4 credits. Prerequisite: consent of the honors committee. Intended for majors graduating in midyear.
Hours to be arranged. Staff.
Independent work under the close guidance of a faculty member selected by the student.

492 Honors Thesis Spring. 4 credits. Prerequisite: consent of the honors committee.
Hours to be arranged. Staff.
Independent work under the close guidance of a faculty member selected by the student.

495 Social Relations Seminar (also Sociology 497) Spring. 4 credits. Limited to seniors majoring in social relations.
Hours to be arranged. A. T. Kirsch.

497–498 Topics in Anthropology 497, fall; 498, spring. Credit to be arranged.
Hours to be arranged. Staff.
Independent reading course in topics not covered in regularly scheduled courses. Students select a topic in consultation with the faculty member who has agreed to supervise the course work.

III. Archaeological Courses

See also courses listed under Archaeology.

250 The Earliest Civilizations Fall. 4 credits.
T R 10:10. J. S. Henderson.
Archaeological approaches to non-Western civilizations. A survey of the beginnings of civilization to Mesopotamia, Egypt, India, and China and the emergence of complex societies in the New World. The problems of defining and recognizing civilizations archaeologically and explaining their emergence are discussed.

352 Interpretation of the Archaeological Record Spring. 4 credits.
Hours to be arranged. C. Morris.
Basic principles and procedures of archaeological data collection and analysis considered in the context of modern archaeological theory. Problems of sampling, the description and statistical treatment of artifacts, and the development of practical archaeological research designs are among the topics covered.

[354 Archaeology of the Americas I Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

355 Archaeology of the Americas II Spring. 4 credits.
M W F 10:10. J. S. Henderson.
A consideration of the origins, development, and spread of the native civilizations of Middle and South America. Prehistoric cultural developments in Mexico, coastal America, and the Andes from the emergence of settled village life to the European discovery of the New World are emphasized.

[358 Archaeological Research Methods (also Archaeology 358) Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

[361 Field Archaeology in South America (also Archaeology 361) Fall. 10 credits. Not offered 1979–80; next offered 1980–81.]

435 Investigation of Andean Institutions: Archaeological Strategies Spring. 4 credits. Prerequisite: reading knowledge of Spanish.
Hours to be arranged. C. Morris.
A seminar considering the role of archaeology in the study of native Andean societies. Topics of current interest are approached by selecting specific written sources that are archaeologically pertinent. Ways of using Andean archaeological data to test and extend the written material are explored. Past archaeological contributions to the understanding of Andean institutions are also examined.

494 Seminar in Archaeology: The Maya Spring. 4 credits. Prerequisite: Anthropology 355 or 432.
T 10:10–12:05. J. S. Henderson.
The problem of reconstructing the history of Maya culture and the varieties of evidence that must be used (archaeological, ethnohistorical, ethnographic, and linguistic) are considered.

IV. Biological and Ecological Anthropology

(See also courses offered by the Human Biology Program.)

[221 Human Biology Spring. 4 credits. Not offered 1979–80; next offered 1980–81.]

[372 Human Biological Variation Fall. 4 credits. Not offered 1979–80; next offered 1981–82.]

[373 Concepts of Race and Human Diversity Spring. 4 credits. Not offered 1979–80; next offered 1980–81.]

374 Human Paleontology Fall. 4 credits.
M W F 2:30. K. A. R. Kennedy.
A broad survey of the fossil evidence for human evolution with special attention to skeletal and dental anatomy, geological contexts, paleoecology, dating methods, archaeological associations, and current theories of primate phylogeny.

[375 Ecology and Human Adaptation Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

471 Laboratory and Field Methods in Biological Anthropology I Spring. 5 credits.
T R 10:10–12:05. K. A. R. Kennedy.
Practical exercises and demonstrations of modern approaches to the methodology of physical anthropology. Emphasis upon comparative primate anatomy, the human paleontological record, description of skeletal and living subjects, paleopathology, skeletal maturation, and relevant field techniques for the archaeologist.

[476 Human Behavior: A Sociobiological Perspective Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

V. Linguistic Anthropology

(See also courses offered in linguistics, listed in the Department of Modern Languages and Linguistics.)

[202 Language and Culture Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

VI. Sociocultural Anthropology

201 Social Anthropology Fall. 4 credits.
M W F 9:05. C. J. Greenhouse.
An introduction to the ways social anthropologists approach the study of human behavior. Students will gain a broad, cross-cultural perspective on how individuals interact with social institutions. The focus is on exchange, ritual, and social control in a variety of cultural contexts. Readings are from anthropologists' first-hand accounts.

301 Biology and Society I: The Biocultural Perspective (also Biological Sciences 301) Fall. 3 or 4 credits (4 credits by arrangement with instructor). Prerequisite: one year of introductory biology. This is part of the two-semester core course for the biology and society major and is also available to other students who have fulfilled the necessary prerequisites.
M W F 10:10. H. B. Sarles.
Human biology, behavior, and institutions are viewed as the ongoing products of the interactions between human biological evolution and cultural change. These interactions are documented with reference to the evolution of the capacity for culture; human groups and institutions; language, meaning, and cultural "realities;" and major models of human nature and human institutions.

302 Biology and Society II: Biology, Society, and Human Values (also Biological Sciences 302) Spring. 3 credits. (4 credits by arrangement with instructor). Prerequisite: Anthropology 301 (Bio S 301). This is the second semester of a two-semester core course for the biology and society major and is also available to other students who have taken Anthropology 301 (Bio S 301).
M W F 10:10. S. M. Brown, Jr. and S. Risch.
The course first documents the history of the academic and nonacademic institutional contexts of the biological and social sciences, then takes up the complex intellectual, practical, and ethical issues centering on the relationships between biological and social phenomena. Specific current issues such as pollution, genetic counseling, and recombinant DNA research are considered and an effort is made to develop viable biocultural ethics for dealing with such problems.

[305 Psychological Anthropology Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

313 Urban Anthropology Spring. 4 credits.
M W F 9:05. R. J. Smith.
An examination of the sociocultural structure and process in urban settings, with emphasis on the role of rural migrants, the relationship of urbanism to political and economic development, the role of voluntary associations, and the adjustment of family and kinship groups to urban life. Asian, African, and Latin American urban centers are emphasized.

314 Applied Anthropology (also Rural Sociology 355) Fall. 4 credits.
Hours to be arranged. Staff.
What anthropology knows or suspects about some general processes of cultural change, and the application of these insights to practical and ethical problems faced in the planning, conduct, and evaluation of programs of intervention and change.

320 Meaning Across Cultures Fall. 4 credits.
T R 10:10–11:30. J. A. Boon.
A comparison of anthropological views of cultures to issues in linguistic and literary theory and semiotics. Are societies machines, therapies, religions, dramas, stories, games, aesthetic forms, or structural codes? From the cosmologies and ceremonies of tribal systems, we move to expressive genres of archaic hierarchies and differentiated arts and sports of nation states.

321 The Anthropology of Women (also Women's Studies 321) Fall. 4 credits.
M W F 2:30. K. S. March.
Explores insights anthropology can provide for the study of women. Focus is on a number of problems regarding aspects of women's position in society and culture and the ways in which these problems can be approached.

322 Comparative Religious Systems Spring. 4 credits.
T R 11:15–12:05 plus one hour by arrangement. A. T. Kirsch.
A survey of anthropological approaches to the study of religion in simple and complex societies. The role of religion in addressing intrinsic strains in personal and social life and in inhibiting or inducing social and cultural change is examined.

323 Kinship and Social Organization Fall. 4 credits.
M W F 11:15. B. Lambert.
The course first reviews family, descent, and marriage systems, then territory, age, and sex are considered as bases for social structure. Kinship networks in complex societies and the structure of Utopian communities are considered last.

[326 Economic Anthropology Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

328 Law and Culture Fall. 4 credits.
M W F 12:20. C. J. Greenhouse.
An examination of interpersonal dispute settlement and conflict resolution in a sociocultural context. The structure of disputes and dispute processing, the interrelationship of legal processes and social organization, ideologies of conflict, and individuals' remedial strategies are specific focuses.

329 Politics and Culture Spring. 4 credits.
M W F 10:10. C. J. Greenhouse.
A cross-cultural examination of public power: its genesis in specific cultural contexts, its articulations, and its functions in society. Some considerations include the relationship of social knowledge to social role, the concept of self-interest, administration as conflict resolution, and the social organization of politics, all from a cross-cultural perspective. This course continues but does not require Anthropology 328.

414 Anthropology and History (also History 404) Spring. 4 credits.
M W F 1:25. E. Fox and staff.
An interdisciplinary course designed to test theories of social organization and action through case studies of specific societies. The first part is devoted to the presentation of basic analytical concepts such as the geographical division of labor and community-region-government interactions. The second part involves application of these concepts to historical examples, both in class discussion and term papers.

418 Ethnohistory Fall. 4 credits.
M W F 2:30. J. V. Murra.
Recent developments in ethnohistory of Andean, African, and Mesoamerican civilizations. Dynastic and popular oral traditions are contrasted and evaluated. Accounts by alien eyewitnesses are also considered. These materials are used to test concepts derived from field anthropology, such as status lineages, rights-in-land, settlement pattern, structural time, and ethnogenesis.

422 Special Problems in the Anthropology of Women (also Women's Studies 422) Spring. 4 credits.
Hours to be arranged. K. S. March.
Each year this seminar focuses on a particular area of concern within the anthropology of women, building upon the work done in Anthropology and Women's Studies 321, which is a survey of the field. The course emphasizes research within the field in concert with others. The topic for 1979–80 is gender symbolism. The seminar investigates different cultural models that give meaning to symbols of femaleness, as well as collective ideas about women and the relationship between these ideas and women's lives.

424 Myth, Ritual, and Sign Fall. 4 credits.
T R 2:30–3:45. J. T. Siegel.
The anthropological understanding of ritual, myth, and other literary productions starts with the analysis of rites of passage and curing ceremonies in relation to notions of person and continues by considering metaphorical usages in social action and the problems of explanation such language engenders.

426 Ethnography of Communication Fall. 4 credits.
Hours to be arranged. Staff.

451 Anthropological Boundaries Fall. 4 credits. S-U grades only. Enrollment limited to 20 students.
T 12:20–2:15. R. Ascher.
The ways in which the creative arts serve as a model for doing anthropology are explored. The works of anthropologists, native artists who use traditional sources, and Western artists who sense a kinship with anthropological questions are studied. The novel, cinema, and poetry are emphasized, but attention is given to still photography, music, drama, and sculpture. About half the course is devoted to native North America; the rest is divided between Africa, Europe, and the contemporary United States.

452 Portraits, Profiles, and Life Histories Spring. 4 credits. S-U grades strongly recommended. Prerequisite: permission of instructor. Limited to 20 students.
T 2:30–4:25. R. Ascher.
The goal is the creation, by each student, of a portrait or life history of one other person. Freedom is granted — and experimentation is encouraged — in the form of observation, recording, and presentation. As a point of departure, a study is made of books such as *Ishi*, films such as *Betty*, and portraits by Giacometti and Arbus.

453 Constructions and Visualizations Spring. 4 credits. S-U grades only. Tentative ideas for original projects should be discussed with the instructor before students sign up for the course.
R 2:30–4:25. R. Ascher.
Anthropology is the study of the human condition. In this course, thoughts about man are expressed through original three-dimensional constructions, tapes, drawing, graphics, video, film, and similar media. Writing can be combined with visual expressions, as, for example, in concrete poetry or photographic essays. Previous examples of such work will be reviewed, but the term project that the student develops through discussion and criticism is the focus of the course.

VII. Theory and History of Anthropology

306 Ethnographic Description Spring. 4 credits.
T R 2:30–3:45. J. T. Siegel.
Anthropology as a discipline depends more on the establishment of its object than on the reinterpretation of central ideas. The topic of this course is the establishment of differences in ethnographic description. How is it that ethnographers determine the characteristics of the populations they study without either assimilating them to what is already known or making them so foreign as to be meaningless? Careful readings of ethnographies are balanced by students' own exercises in description.

412 Contemporary Anthropological Theory Spring. 4 credits.
M W F 11:15. B. Lambert.
The assumptions social anthropologists make concerning the nature of society and culture, and the explanations they have proposed for regularities in social behavior, values, and belief systems are surveyed. Among the approaches considered are processual analysis, the use of the concept of transaction, the historical method, ethnoscience, and structuralism.

[413 History of Anthropology in the United States Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

417 Structuralism Spring. 4 credits.
T R 10:10–11:30. J. A. Boon.
The corpus of Claude Lévi-Strauss is studied and diverse structuralist texts which raise general issues

in philosophy, criticism, and the comparative method are read. An effort is made to assess the place of structuralism in the history of ideas.

[420 Development of Anthropological Thought Spring. 4 credits. Not offered 1979–80; next offered 1980–81.]

425 World Religions and Cultural Pluralism Spring. 4 credits.
T 2:30–4:25. J. A. Boon.
The course deals directly with Southeast Asia and indirectly with other areas that display similar religious texts and institutions. Using both colonial and post-colonial ethnographies and novels, efforts to portray the complexities and subcurrents of traditions that appear Buddhist, or Hindu-Buddhist, or Muslim are assessed. Contexts include monasteries, courts, "communities," and cultural performances. Ethnographers and novelists such as Hocart, Rassers, Geertz, Tambiah, Multatuli, and Forster are considered.

475 Physical Anthropology: History and Theory Spring. 4 credits.
Hours to be arranged. K. A. R. Kennedy.
The historical background of present-day concepts of man's evolutionary variations and adaptations in space and time is surveyed. The formation of biological anthropology as an area of scientific inquiry within the social sciences is reviewed.

VIII. Area Courses

230 Ethnology of Native North America Fall. 4 credits. Next offered 1981–82.
M W F 10:10. C. F. Hockett.
The ethnography of North America is surveyed, with emphasis on problems and topics to which the North American materials are most relevant. Selected cultures are considered in some detail.

331 The United States Spring. 2 credits.
Prerequisite: one course in sociocultural anthropology or consent of the instructor.
W 2:30–4. C. J. Greenhouse.
Contemporary social anthropologists have tended not to do field research in the United States. What can social anthropology contribute to our knowledge of our own society and culturality? Is the United States a special case or can it be studied in the usual manner of anthropologists? The course deals with both of these questions, looking first at United States ethnographies, novels, and other sources, and second at selected cross-cultural studies to assess their relevance to the United States.

333 Ethnology of the Andean Region Fall. 4 credits.
M W F 9:05. J. V. Murra.
Cultural continuities in the development of Andean societies. The ecological, archaeological, ethnohistorical, and contemporary ethnological record. The Andean heritage as a resource for "modernization."

334 Ethnology of Island Southeast Asia Fall. 4 credits.
T R 10:10–11:30. J. T. Siegel.
Peoples and cultures of Indonesia and the Philippines are discussed focusing on kinship, politics, and language and cultures.

335 Ethnology of Mainland Southeast Asia Fall. 4 credits.
Hours to be arranged. A. T. Kirsch.
The peoples and cultures of mainland Southeast Asia from prehistoric to contemporary times are surveyed.

336 Ethnology of Oceania Fall. 4 credits.
M W F 1:25. B. Lambert.
The native cultures of Polynesia, Micronesia, Melanesia, and Australia are described. Ecological adaptations, prehistory, and navigational methods are surveyed first, then such topics as social structures, overseas trade, religion, and recent cultural changes are considered in more depth.

[338 Ethnology of Africa Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

344 Modern Chinese Society Spring. 4 credits.
M W F 1:25. D. R. DeGlopper.
Changes in Chinese society and culture, among the overseas Chinese, in Hong Kong and Taiwan, and in China proper are emphasized.

345 Japanese Culture and Society Fall. 4 credits.
M W F 9:05. R. J. Smith.
The social structure of Japan is surveyed and trends in urban and rural life during the past century are discussed. The family, ancestor worship, community and social organization, and urbanism and modernization are the topics emphasized.

[348 Spanish Culture and Society Spring. 4 credits. Not offered 1979–80; next offered 1981–82.]

432 Indians of Mexico and Central America Spring. 4 credits.
M W F 12:20. C. J. Greenhouse and J. S. Henderson.
Sociocultural and archaeological approaches to the study of indigenous populations in this region are integrated. The historical perspective permits a better assessment of Indian culture and its present-day interface with non-Indian culture in the area. Sources include firsthand accounts by natives, conquerors, archaeologists, and social anthropologists.

[433 Andean Thought and Culture Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

456 Mesoamerican Thought and Culture Fall. 4 credits. Prerequisite: Anthropology 355 or 432.
T 12:20–2:15. J. S. Henderson.
Aspects of Mesoamerican culture revealed in pre-Columbian painted books — especially religion, astrology, and concepts of time and space — are considered. Historical and ethnohistorical sources are also discussed.

IX. Related Courses in Other Departments

Introduction to Archaeology (Archaeology 100)

Popular Archaeology (Archaeology 107)

Introduction to Art History: African Art (History of Art 215)

History of Archaeology (Archaeology 281)

Individual Study in Archaeology and Related Fields (Archaeology 300)

Archaeology of the Ancient Near East (Archaeology 310)

Historical Archaeology (Archaeology 311)

Archaeology of Ancient Europe (Archaeology 313)

Interconnections in the Eastern Mediterranean World in Antiquity (Near Eastern Studies 385)

Archaeology of Ancient Egypt (Near Eastern Studies 388)

Humanity and Animality: Social Anthropology and Sociobiology (Society for the Humanities 419)

Literature and Social Change in Historical Perspective (Society for the Humanities 426)

Naturalistic Views of Society Before Darwin (Society for the Humanities 427 and Biology and Society 400)

Naturalistic Views of Society After Darwin (Society for the Humanities 428 and Biology and Society 401)

X. Graduate Seminars

600-level courses are open to undergraduates who have fulfilled the prerequisites or who have obtained permission of the instructor.

Southeast Asia Seminar: Vietnam (Asian Studies 601)

Southeast Asia Seminar: Malaysia (Asian Studies 602)

607–608 Special Problems in Anthropology 607, fall; 608, spring. Credit to be arranged.
Hours to be arranged. Staff.

611 Principles of Social Anthropological Theory Fall. 4 credits.
M 1:25–3:20. J. A. Boon.
The intellectual history of the comparative method, including Renaissance and Enlightenment ethnology and preprofessional classics in social and cultural analysis are explored. Marx, Frazer, Durkheim, Weber, and other crucial nineteenth and early twentieth century figures are considered with an eye towards concerted schools of anthropology, including Boasian approaches in America, functionalism in Britain, and *L'Annee sociologique* on the Continent.

[619 *Anthropological Approaches to the Study of Buddhism in Asia Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

[627 Law in the Context of Culture Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

628 Political Anthropology (also Government 628) Spring. 4 credits. Prerequisite: knowledge of Indonesian.
R 7:30 p.m. J. T. Siegel and B. R. Anderson.
The relationship of politics to culture through the works of such authors as Iwan Simatupang, Pramoedya Anata Toer, and Armijn Pané is studied.

632 Andean Symbolism Spring. 4 credits. Prerequisite: reading knowledge of Spanish.
Hours to be arranged. B. J. Isbell.
Current research on Andean myths, rituals, and other symbolic systems such as conceptualizations of time and space is examined. Both ethnohistorical and modern ethnographic research are discussed.

633 Andean Research Fall. 4 credits.
Hours to be arranged. J. V. Murra.

634–635 Southeast Asia: Readings in Special Problems 634, fall; 635, spring. Credit to be arranged.
Hours to be arranged. J. A. Boon, A. T. Kirsch, J. T. Siegel.

643 Issues in the Study of Caste Fall. 4 credits.
Hours to be arranged. D. B. McGilvray.
A critical evaluation of competing theories and approaches to caste organization in South Asia, with emphasis on regional and historical variation.

644 The Interpretation of Ritual and Belief in South Asia Spring. 4 credits.
Hours to be arranged. D. B. McGilvray.
Selected problems in the anthropological study of ritual and belief systems in South Asia, including temple organization, domestic rites, and the orientation of individual actors.

648 Comparative Study of Complex Societies Spring. 4 credits.
W 2:30–4:25. D. R. DeGlopper.
A graduate seminar on various approaches to the study of complex pre-modern societies or agrarian civilizations. The concepts of great and little traditions are reexamined and the integration of communities into larger political, economic, and cultural systems is considered.

[651 Anthropological Boundaries: Graduate Spring. 4 credits. Not offered 1979–80; next offered 1980–81.]

[653 Constructions and Visualizations: Graduate Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

[663 Problems in Archaeology: Early Man in America Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

[664 Problems in Archaeology: The Andes Spring. 4 credits. Not offered 1979–80; next offered 1980–81.]

[666 The Discovery of America Spring. 4 credits. Not offered 1979–80; next offered 1981–82.]

[667 Origins of Mesoamerican Civilization Spring. 4 credits. Not offered 1979–80; next offered 1980–81.]

Architecture in Its Cultural Context (Architecture 667–668)

[677 Topics in Ecological Anthropology Spring. 4 credits. Not offered 1979–80; next offered 1980–81.]

[678 Palaeoanthropology: South Asia Fall. 4 credits. Not offered 1979–80; next offered 1981–82.]

901–902 Field Research 901, fall; 902, spring. Credit to be arranged.
Hours to be arranged. Staff.

Archaeology

100 Introduction to Archaeology Spring. 3 credits.
M 4:15, W F 1:25. D. M. Jones.
The history, methods, and theory of archaeology are introduced. Lectures briefly outline the nature of archaeologically known cultures around the world to help illustrate the variety of archaeological sites and materials.

101 Introduction to Archaeology, Section Spring. 1 credit. Optional section to be taken concurrently with Archaeology 100. Prospective archaeology majors are expected to participate in this section, although it is open to all interested students.
M 1:25. D. M. Jones and staff.
The main outlines of world archaeology are discussed briefly in terms of research problems. Seminars on particular archaeological cultures or topics are given by various archaeology staff members.

107 Popular Archaeology (Section 01) Fall and spring. 3 credits. Freshman Seminar.
M W F 1:25. S. J. Oberon.
Popular conceptions of prehistory that have antagonized the archaeological establishment are focused on. Readings include both scholarly and popular books, and careful and critical analysis of archaeological evidence is emphasized. Possible visits to earth by extraterrestrial beings, the Atlantis and Mu myths, the development of New World civilizations, and time capsules are among the topics discussed.

107 Popular Archaeology (Section 02) Fall. 3 credits. Freshman Seminar.
M W F 12:20. R. Sternberg.

108 The Origins and Diversity of the Family in Antiquity Fall. 3 credits. Freshman Seminar.
M W F 9:05. L. A. McKee.
The course concerns the study of ancient family units as cultural subsystems. We explore the range of forms and functions of the basic social unit, the family, as these are reflected in the archaeological record. Some of the theoretical questions we pursue are (1) evolutionary theories of the origin of the family, (2) the relationships between ecology and family structure, (3) the merits of approach to archaeological data and the reconstruction of ancient cultures through the methods of cultural history or through processual analysis.

300 Individual Study in Archaeology and Related Fields Fall or spring. Credit to be arranged. Prerequisite: Archaeology 100 or permission of instructor.
Hours to be arranged. Staff.
Students pursue topics of particular interest with the guidance of a faculty member.

Theory and Interdisciplinary Approaches

Earth Science (Geological Sciences 103)

Earth Science Laboratory (Geological Sciences 105)

The Earliest Civilizations (Anthropology 250)

281 History of Archaeology Fall. 3 credits.
T R 2:30–3:45. D. M. Jones.
The development of archaeological studies from sixteenth-century antiquarianism to the present day are surveyed. Concepts of man's past and scientific frameworks derived from these concepts are emphasized.

[301 Archaeological Ceramics Not offered 1979–80.]

311 Historical Archaeology: Method and Theory Fall. 4 credits.
T R 10:10–11:25. D. M. Jones.
A general introduction which draws examples from both Europe and North America. Theory and practical questions are addressed, including the use and interpretation of archival material. The approaches of the anthropologist and the historian are assessed using actual site reports as examples.

Geomorphology (Geological Sciences 345)

Interpretation of the Archaeological Record (Anthropology 352)

[358 Archaeological Research Methods (also Anthropology 358) Fall. 4 credits. Not offered 1979–80; next offered 1981–82.]

[Ceramics (History of Art 423) Not offered 1979–80.]

Use of Soil Information and Maps as Resource Inventories (Agronomy 506)

Architectural Problems in Archaeological Fieldwork (Architecture 540)

Surveying for Archaeologists (Architecture 541)

Glacial and Quaternary Geology (Geological Sciences 642)

Old World Archaeology

Freshman Seminar in Archaeology (Classics 121)

Mediterranean Archaeology (Classics 200 and Near Eastern Studies 280)

Rise of Classical Greece (Classics 206)

Introduction to Classical Archaeology (Classics 220 and History of Art 220)

Minoan-Mycenaean Art and Archaeology (Classics 221 and History of Art 221)

Archaeology in Action I (Classics 232)

Archaeology in Action II (Classics 233)

The History of Ancient Israel (Near Eastern Studies 243)

History of Preindustrial Building (Architecture 244)

Introduction to Art History: Art of Egypt and Mesopotamia (Near Eastern Studies 248 and History of Art 211)

275 Ancient Seafaring (also Near Eastern Studies 249) Fall. 3 credits.
T R 10:10–11:25. D. I. Owen.

[Ancient Near Eastern Literature (Near Eastern Studies 282) Not offered 1979–80.]

[Introduction to Biblical Archaeology (Near Eastern Studies 285) Not offered 1979–80.]

Dendrochronology of the Aegean (Classics 309)

310 Archaeology of the Ancient Near East (also Near Eastern Studies 387) Spring. 4 credits. Prerequisite: Archaeology 100 or permission of instructor.
T R 2:30–3:45. J. M. Weinstein.

313 Archaeology of Ancient Europe Spring. 4 credits. Prerequisite: Archaeology 100 or consent of instructor.
T R 2:30–3:45. D. M. Jones.
The foundations of European society up to the Roman conquest are studied through archaeological materials. Ancient European economy, society, politics, and trade are emphasized.

[Arts and Monuments of Athens (Classics 320 and History of Art 320) Not offered 1979–80.]

Archaeology of Cyprus (Classics 321 and History of Art 321)

[Arts of the Roman Empire (History of Art 322) Not offered 1979–80.]

[Painting in the Greek and Roman World (History of Art 323) Not offered 1979–80.]

[Architecture in the Greek and Roman World (History of Art 324) Not offered 1979–80.]

Greek Vase Painting (History of Art 325)

[Art and Archaeology of Archaic Greece (Classics 326 and History of Art 326) Not offered 1979–80.]

Greek and Roman Coins (History of Art 327)

Greek Sculpture (Classics 329)

Art in Pompeii: Origins and Echoes (History of Art 330)

The Architecture of the Classical World (Architecture 341)

[Age of the Patriarchs (Near Eastern Studies 344) Not offered 1979–80.]

Independent Study: Ancient Israel (Near Eastern Studies 348)

Independent Study: Ancient Near East (Near Eastern Studies 349)

[Interconnections in the Eastern Mediterranean World in Antiquity (Near Eastern Studies 385) Not offered 1979–80.]

Archaeology of Ancient Egypt (Near Eastern Studies 388)

[Seminar in Syro-Palestinian Archaeology (Near Eastern Studies 481) Not offered 1979–80.]

[Seminar in Aegean Archaeology (Classics 629) Not offered 1979–80.]

[Seminar in Classical Greek Archaeology (Classics 630) Not offered 1979–80.]

Seminar in the Architecture of the Classical World (Architecture 641)

New World Archaeology

[The Discovery of America (Anthropology 150) Spring. Not offered 1979–80; next offered 1981–82.]

[312 Archaeology of the European Colonial Movement Spring. 4 credits. Prerequisite: Archaeology 100 or consent of instructor. T R 2:30–3:45. D. M. Jones. Not offered 1979–80; next offered 1981–82.]

[Archaeology of the Americas I (Anthropology 354) Fall. Not offered 1979–80; next offered 1980–81.]

Archaeology of the Americas II (Anthropology 355)

[361 Field Archaeology in South America (also Anthropology 361) Fall. 10 credits. T. F. Lynch. Not offered 1979–80; next offered 1981–82.]

The Investigations of Andean Institutions: Archaeological Strategies (Anthropology 435)

Mesoamerican Thought and Culture (Anthropology 456)

Seminar in Archaeology: The Maya (Anthropology 494)

Seminar in Andean Research (Anthropology 633)

[Problems in Archaeology: Early Man in America (Anthropology 663) Fall. Not offered 1979–80; next offered 1980–81.]

[Problems in Archaeology: The Andes (Anthropology 664) Spring. Not offered 1979–80; next offered 1981–82.]

[The Discovery of America (Anthropology 666) Spring. Not offered 1979–80; next offered 1981–82.]

[Origins of Mesoamerican Civilizations (Anthropology 667) Spring. Not offered 1979–80; next offered 1980–81.]

Related Courses for Archaeology Majors

Ethnology of the Andean Region (Anthropology 333)

Ethnology of Oceania (Anthropology 336)

Human Paleontology (Anthropology 374)

Ethnohistory (Anthropology 418)

Indians of Mexico and Central America (Anthropology 432)

[Andean Thought and Culture (Anthropology 433) Fall. Not offered 1979–80; next offered 1980–81.]

Laboratory and Field Methods in Biological Anthropology (Anthropology 471)

[Paleoanthropology: South Asia (Anthropology 678) Not offered 1979–80; next offered 1981–82.]

[Introduction to Asian Civilizations (History 190) Not offered 1979–80.]

[Latin American History to 1825 Not offered 1979–80.]

The Emergence of Greek Democracy (History 265)

The Crisis of Greek Civilization (History 266)

History of China up to Modern Times (History 393)

Southeast Asian History to the Fourteenth Century (History 395)

[Archaic Greece 776–500 B.C. (History 450) Not offered 1979–80.]

[The Roman Revolution (History 461) Not offered 1979–80.]

[The High Roman Empire (History 462) Not offered 1979–80.]

[Science in Classical Antiquity (History 481–482) Not offered 1979–80.]

[Seminar in Ancient Classical History (History 661) Not offered 1979–80.]

Introduction to Art History: Asian Traditions (History of Art 280)

[The Arts of Early China (History of Art 383) Not offered 1979–80.]

[Studies in Indian and Southeast Asian Art (History of Art 386) Not offered 1979–80.]

[Traditional Arts in Southeast Asia (History of Art 488) Not offered 1979–80.]

The Greek Experience (Classics 211)

The Roman Experience (Classics 212)

The Individual and Society in Classical Athens (Classics 222)

Greek Mythology (Classics 236 and Comparative Literature 236)

The Ancient Epic (Classics 238 and Comparative Literature 238)

Greek and Roman Drama (Classics 300 and Comparative Literature 300)

Christian Origins (Comparative Literature 326)

Literature of the Old Testament (Comparative Literature 328)

Old Testament Seminar (Comparative Literature 421)

New Testament Seminar (Comparative Literature 426)

Readings in the New Testament (Comparative Literature 429)

Jews of the Ancient and Muslim Near East: 450 B.C.E.–1204 C.E. (Near Eastern Studies 244)

Elementary Akkadian (Near Eastern Studies 323–324)

Theory and Practice of Linguistics (Linguistics 101–102)

Comparative Methodology (Linguistics 404)

Hittite (Linguistics 621–622)

Comparative Indo-European Linguistics (Linguistics 631–632)

Introductory Geological Science (Geological Sciences 101)

Introduction to Historical Geology (Geological Sciences 102)

Structural Geology and Sedimentation (Geological Sciences 325)

Historical Geology and Stratigraphy (Geological Sciences 376)

Nature and Properties of Soils (Agronomy 200)

Identification, Appraisal, and Geography of Soils (Agronomy 301)

Geography and Appraisal of Soils of the Tropics (Agronomy 401)

Morphology, Genesis, and Classification of Soils (Agronomy 603)

Plants and Man (Biological Sciences 241)

Engineering Surveying and Evaluation (Engineering CEE A380)

Photogrammetry (Engineering CEE A661)

Advanced Physical Environment Evaluation (Engineering CEE A686)

Analyses and Interpretation of Aerial Photographs (Engineering CEE A687)

Plane Surveying (Agricultural Engineering 221)

Scientific Illustration (Floriculture 417)

Beginning Photography (Architecture 250 and Art 161)

Intermediate Photography (Architecture 350 and Art 162)

Color Photography (Architecture 350 and Art 262)

Case Studies in Preservation Planning (Architecture 544)

Design and Conservation (Architecture 545)

Documentation for Preservation Planning (Architecture 546)

Elementary Statistics (Mathematics 370)

Statistics (Mathematics 472–473)

Introductory Statistics for the Social Sciences (Industrial Relations 510)

Computer Science courses numbered 100, 101, 102, 104, and 211 may be of interest to some students (see the department listing for information about sequences and combinations).

Asian Studies

Freshman Seminars

101 Japanese Conceptions of Beauty Spring. 3 credits.
T R 2:30–4. B. deBary.
The central aesthetic values of the Japanese tradition as they have been expressed in diverse arts are examined. The literary arts (poetry, narrative, and dramatic writing) are emphasized, but architecture, brush painting, flower arranging, and other arts are considered.

103 Revolutions and Social Values in Modern Chinese Literature Spring. 3 credits.
M W 2:30–4. E. M. Gunn, Jr.
How Chinese writers in the twentieth century have used literature to affirm or dissent with social and political institutions and events in China from the collapse of the imperial dynasty to the present.

105 Feminine and Masculine Ideals in Japanese Culture (also Women's Studies 105) Fall. 3 credits.
M W F 1:25. K. Brazell.
In its long history, Japanese culture has developed a large number of role models — the aristocrat, poet-priest, warrior, entertainer, "salary man" and "education mama" — and idealized them in its literature and art. Using these ideals as its subject matter, the seminar will give students practice in reading texts closely, analyzing ideas, and writing various types of papers. Through studying Japanese concepts of femininity and masculinity, the students will not only explore a new culture, but will also gain new perspectives on their own culture.

Related Courses in Other Departments

[Government 100 Contemporary Japan Fall. 3 credits. T. J. Pempel. Not offered 1979–80.]

Government 100.6 Literature and Politics Spring. 3 credits.
B. Anderson.

[History 293 China and the European Psyche Fall. 4 credits. C. A. Peterson. Not offered 1979–80.]

[History 294 Chinese Views of Themselves Spring. 4 credits. S. G. Cochran. Not offered 1979–80.]

History of Art 106 Art in a Landscape Spring. 3 credits. S. J. O'Connor.

Asia—Literature and Religion Courses

The following courses are taught entirely in English and are open to any Cornell student.

250 The Nature of Religious Experience Spring. 4 credits.
T R 1:25–2:40. A. G. Grapard.
Eastern and Western religious traditions are drawn on to examine psychological, philosophical, and anthropological approaches to religious experiences.

302 Introduction to Japan Spring. 3 or 4 credits.
Hours to be arranged. K. Brazell and staff.
An interdisciplinary introduction to Japanese culture especially designed for students not majoring in Asian studies.

307 Asian Dance and Dance Drama (also Theatre Arts 307) Fall. 3 credits.
Hours to be arranged. Staff.
A different dance tradition will be taught each year (contact the department for more information).

351 Introduction to Asian Religions Fall. 4 credits.
T R 1:25–2:40. A. G. Grapard.
An introduction to the thought and practice of Hinduism and Theravada Buddhism.

352 Mahayana Buddhism Spring. 4 credits. Asian Studies 351 recommended but not required.
T R 11:15–12:30. A. G. Grapard.
The intellectual, religious, and social development of the Mahayana tradition in East Asia is studied. Both sutras and religious practices are carefully examined.

[371 Chinese Philosophical Literature Fall. 4 credits. T. Mei. Not offered 1979–80.]

[372 Chinese Poetry Spring. 4 credits. T. Mei. Not offered 1979–80 (alternates with Asian Studies 374).]

373 Twentieth-Century Chinese Literature Fall. 4 credits.
M W F 1:25. E. M. Gunn, Jr.
The modern vernacular, which has reflected and promoted political, social, and cultural change in China, is studied.

374 Chinese Narrative Literature Spring. 4 credits.
M W F 10:10. E. M. Gunn, Jr.
Selected works in classical Chinese fiction are read in translation. Major novels such as the *Dream of the Red Chamber* and *Water Margin* are emphasized.

[375 Japanese Poetry and Drama Fall. 4 credits. K. Brazell. Not offered 1979–80 (alternates with Asian Studies 377).]

376 Modern Japanese Fiction Spring. 4 credits.
Lec, T 11:15; seminar, R 11:15–1 or 2:30–3:45.
B. deBary.
The major Japanese novelists and short story writers of the twentieth century are studied in translation.

377 Japanese Narrative Literature Fall. 4 credits.
T R 2:30–4. K. Brazell.
The major narratives from the *Tale of Genji* to Saikaku are studied in translation.

[379 Southeast Asian Literature in Translation Fall. 4 credits. Not offered 1979–80.]

[400 Japanese No Theater Spring. 4 credits. K. Brazell. Not offered 1979–80.]

414 The Japanese Film Fall. 3 credits.
Lec and disc, M 2:30–4:25; weekly film viewing to be arranged. B. deBary.
The technical and thematic development of the Japanese film is studied.

[451 Japanese Religions Fall. 4 credits. A. G. Grapard. Not offered 1979–80 (alternates with Asian Studies 453).]

453 Zen Buddhism Fall. 4 credits. Prerequisite: 351, 451, or permission of instructor.
T R 10:10–11:25. A. G. Grapard.
A historical and scriptural approach to the trends in Buddhism which flourished in China and Japan under the name of Ch'an (Zen). Literary and aesthetic manifestations are analyzed as well.

461 Chinese and Japanese Bibliography and Methodology Fall. 1 credit. Prerequisite: permission of instructor. Required of honors students and master of arts candidates.
W 3:30–5. D. Perushek.

Asia—General Courses

401 Asian Studies Honors Course Fall. 4 credits. Intended for seniors who have been admitted to the honors program.
Staff.
Supervised reading and research on the problem selected for honors work.

402 Asian Studies Honors: Senior Essay Fall or spring. 4 credits. Prerequisite: admission to the honors program.
The student, under faculty direction, prepares an honors essay.

403–404 Asian Studies Supervised Reading Either or both terms. Credit to be arranged. Prerequisite: permission of instructor. Open to majors and other qualified students.
Intensive reading under the direction of a member of the staff.

For complete descriptions of courses numbered 600 or above, consult the graduate faculty representative.

605–606 Master of Arts Seminar in East Asian Studies 605, fall; 606, spring. 2 to 4 credits.
Hours to be arranged. E. M. Gunn, Jr., and staff.

650 Seminar on Asian Religions Spring. 2 to 4 credits. Prerequisite: permission of the instructor.
Hours to be arranged. A. G. Grapard.
Topic is announced annually.

701–702 Seminar in East Asian Literature 701, fall; 702, spring. 1 to 4 credits.
Hours to be arranged. Staff.

703–704 Directed Research 703, fall; 704, spring. Credit to be arranged.
Time to be arranged. Staff.

Related Courses in Other Departments

Economics of Agricultural Development (Agricultural Economics 464)

Food, Population, and Employment (Agricultural Economics 660)

Communication in the Developing Nations (Communication Arts 624)

Comparative Mass Media (Communication Arts 626)

Seminar on Agricultural Development in Southeast Asia (International Agriculture 601)

[Applications of Sociology to Development Programs (Rural Sociology 751) Not to be given in 1979–80.]

[Architecture in Its Cultural Context (Architecture 667–668) Not offered 1979–80.]

The seven courses listed above will count as College of Arts and Sciences credit only for Asian studies majors.

Urban Anthropology (Anthropology 313)

Meaning Across Cultures (Anthropology 320)

Anthropological Approaches to the Study of Buddhism in Asia (Anthropology 619)

Politics of Industrial Societies (Government 348)

[Political Role of the Military (Government 349) Not offered 1979–80.]

[Comparative Revolutions (Government 350) Not offered 1979–80.]

The United States and Asia (Government 387)

Seminar in Comparative Communism (Government 446)

[Policymaking in Industrial Societies (Government 456–457) Not offered 1979–80.]

[Field Seminar in International Relations (Government 606) Not offered 1979–80.]

[Graduate Seminar in Comparative Communism (Government 648) Not offered 1979–80.]

Seminar in International Relations of Asia (Government 687)

[Introduction to Asian Civilizations: Origins to 1600 (History 190) Not offered 1979–80.]

Introduction to Asian Civilizations: From 1600 (History 191)

Supervised Reading (History 703–704)

Introduction to Art History: Asian Traditions (History of Art 280)

[Buddhist Art in Asia (History of Art 381) Not offered 1979–80.]

[Studies in Indian and Southeast Asian Art (History of Art 386) Not offered 1979–80.]

[Ceramic Art of Asia (History of Art 482) Not offered 1979–80.]

[Problems in Asian Art (History of Art 580) Not offered 1979–80.]

Supervised Readings (History of Art 591–592)

Literature and Social Change in Historical Perspective (Society for the Humanities 426)

China — Area Courses

[Traditional Chinese Society and Culture (Anthropology 343) Not offered 1979–80.]

Modern Chinese Society (Anthropology 344)

[Chinese Government and Politics (Government 347) Not offered 1979–80.]

The Foreign Policy of China (Government 390)

[Readings on the Great Cultural Revolution (Government 447) Not offered 1979–80.]

[Capitalism and Communism: Chinese and Japanese Patterns of Development (Government 462) Not offered 1979–80.]

[Politics of China (Government 645) Not offered 1979–80.]

[Readings from Mao Tse-tung (Government 651) Not offered 1979–80.]

[Culture and the Mass Line in China (Government 654) Not offered 1979–80.]

[China and the European Psyche (History 293) Not offered 1979–80.]

[Chinese Views of Themselves (History 294) Not offered 1979–80.]

Warfare in Premodern Societies (History 360)

Art and Society in Modern China (History 390–391)

History of China up to Modern Times (History 393)

History of China in Modern Times (History 394)

[Undergraduate Seminar in Medieval Chinese History (History 492) Not offered 1979–80.]

Self and Society in Late Imperial and Twentieth-Century China (History 493)

[Undergraduate Seminar: The First Chinese Revolution, 1880–1930 (History 494) Not offered 1979–80.]

Chinese Historiography and Source Materials (History 691)

Problems in Modern Chinese History (History 693–694)

[Seminar in Medieval Chinese History (History 791–792) Not offered 1979–80.]

Seminar in Modern Chinese History (History 793–794)

[Art of China (History of Art 383) Not offered 1979–80.]

Chinese Painting and Ceramics (History of Art 385)

[Chinese Art of the T'ang Dynasty (History of Art 483) Not offered 1979–80.]

Studies in Chinese Painting (History of Art 486)

[Problems in Chinese Art (History of Art 584) Not offered 1979–80.]

Art and Society in Modern China (Society for the Humanities 390–391)

Other courses dealing extensively with China are Anthropology 322; Government 347, 348, 350, 387, 446, 456–457, and 687; History 190 and 191; History of Art 280 and 580; and Architecture 667–668.

China—Language Courses

Basic Course (Chinese 101–102)

Cantonese Basic Course (Chinese 111–112)

Intermediate Chinese I (Chinese 201–202)

Chinese Conversation (Chinese 203–204)

Intermediate Cantonese (Chinese 211–212)

Intermediate Chinese II (Chinese 301)

Intermediate Chinese III (Chinese 302)

Chinese Conversation — Intermediate (Chinese 303–304)

Intermediate Cantonese II (Chinese 311–312)

FALCON (full-time intensive course, Chinese 161–162)

[History of the Chinese Language (Chinese 401–402) Not offered 1979–80.]

Linguistic Structure of Chinese: Phonology and Morphology (Chinese 403)

Linguistic Structure of Chinese: Syntax (Chinese 404)

Chinese Dialects (Chinese 405)

Chinese Dialect Seminar (Chinese 607)

Sino-Tibetan Linguistics (Linguistics 662)

China—Literature Courses

Introduction to Classical Chinese (Chinese 213–214)

Chinese Philosophical Texts (Chinese 313)

Classical Narrative Texts (Chinese 314)

T'ang and Sung Poetry (Chinese 420)

Readings in Modern Chinese Literature (Chinese 411–412)

Directed Study (Chinese 421–422)

Readings in Literary Criticism (Chinese 424)

Readings in Folk Literature (Chinese 430)

[Seminar in Chinese Poetry and Poetics (Chinese 603) Not offered 1979–80.]

[Seminar in Chinese Fiction (Chinese 605) Not offered 1979–80.]

Seminar in Folk Literature (Chinese 609)

Advanced Directed Reading (Chinese 621–622)

Japan—Area Courses

Japanese Culture and Society (Anthropology 345)

[Introduction to Japanese Economy (Economics 366) Not offered 1979–80.]

[Contemporary Japan (Government 100) Not offered 1979–80.]

[Politics in Contemporary Japan (Government 346) Not offered in 1979–80.]

[Politics of Productivity: Germany and Japan (Government 430) Not offered 1979–80.]

[Capitalism and Communism: Chinese and Japanese Patterns of Development (Government 462) Not offered 1979–80.]

Other courses dealing extensively with Japan are: Anthropology 313; Government 348, 387, 446, 456–457, and 605; History 190 and 191; History of Art 280 and 580; and Architecture 667–668.

Japan—Language Courses

Basic Course (Japanese 101–102)

Accelerated Introductory Japanese (Japanese 121–122)

Intermediate Japanese I (Japanese 201–202)

Japanese Conversation (Japanese 203–204)

Intermediate Japanese I and Conversation (Japanese 205–206)

Intermediate Japanese II (Japanese 301–302)

Japanese Communicative Competence (Japanese 303–304)

Advanced Japanese (Japanese 401–402)

Linguistic Structure of Japanese (Japanese 404)

Oral Narration and Public Speaking (Japanese 407–408)

FALCON (full-time intensive course, Japanese 161–162)

Japan—Literature Courses

Introduction to Literary Japanese (Japanese 305–306)

Intermediate Literary Japanese (Japanese 405–406)

Directed Readings (Japanese 421–422)

Seminar in Modern Literature (Japanese 611)

Seminar in Classical Literature (Japanese 612)

Advanced Directed Readings (Japanese 621–622)

South Asia—Area Courses

[Architecture in Its Cultural Context (Architecture 667–668) Not offered 1979–80.]

Seminar on Agricultural Development in Southeast Asia (International Agriculture 601)

[Government and Politics of India (Government 351) Not offered 1979–80.]

[India: A Political Experiment (Government 451) Not offered 1979–80.]

[Studies in Indian and Southeast Asian Art (History of Art 386) Not offered 1979–80.]

[India as a Linguistic Area (Linguistics 341) Not offered 1979–80.]

[Dravidian Structures (Linguistics 440) Not offered 1979–80.]

[Indo-Aryan Structures (Linguistics 442) Not offered 1979–80.]

Comparative Indo-European Linguistics (Linguistics 631–632)

Elementary Pali (Linguistics 640)

Elementary Sanskrit (Linguistics 641–642)

Comparative Indo-Aryan (Linguistics 644)

[Comparative Dravidian (Linguistics 646) Not offered 1979–80.]

Seminar (Linguistics 700)

Directed Research (Linguistics 701–702)

Other courses dealing extensively with South Asia are: Anthropology 425 and 628; Asian Studies 250 and 351; Government 387, 605, and 687; History 190 and 191; History of Art 280, 386, and 580; Agricultural Economics 464; Communication Arts 624 and 626; and Rural Sociology 751.

South Asia—Language Courses

Basic Course (Hindi-Urdu 101–102)

Hindi Reading (201–202)

Composition and Conversation (Hindi 203–204)

Readings in Hindi Literature (Hindi 301–302)

Advanced Composition and Conversation (Hindi 303–304)

Advanced Hindi Readings (Hindi 305–306)

[History of Hindi (Hindi 401) Not offered 1979–80.]

Seminar in Hindi Linguistics (Hindi 700)

Basic Course in Sinhala (Sinhalese 101–102)

Sinhala Reading (Sinhalese 201–202)

Composition and Conversation (Sinhalese 203–204)

Basic Course (Tamil 101–102)

[Basic Course (Telugu 101–102) Not offered 1979–80.]

[Telugu Reading (Telugu 201–202) Not offered 1979–80.]

Southeast Asia—Area Courses

[History of Asian Architecture (Architecture) Not offered 1979–80.]

Ethnographic Films (Anthropology 205)

Ethnology of Island Southeast Asia (Anthropology 334)

Ethnology of Mainland Southeast Asia (Anthropology 335)

Geography and Appraisal of Soils of the Tropics (Agronomy 401)

Myth, Ritual, and Symbol (Anthropology 424)

Special Problems in Anthropology (Anthropology 608)

Southeast Asia: Readings in Special Problems (Anthropology 634–635)

Political Anthropology: Culture and Revolution in Indonesia (Anthropology 628 and Government 647)

Southeast Asia Seminar: Vietnam (Asian Studies 601) Fall. Credit to be arranged.
G. McT. Kahin.

Southeast Asia Seminar: Malaysia (Asian Studies 602) Spring. Credit to be arranged.
Visiting faculty.

[Southeast Asia Seminar (Asian Studies 604; also International Agriculture 601, Philippine Agricultural Development) Not offered 1979–80.]

Southeast Asia Research Training Seminar (Asian Studies 676)

[Economic Policy and Development in Southeast Asia (Economics 365) Not offered 1979–80.]

Process of Economic Development (Economics 371/571)

[Economic Growth in Southeast Asia (Economics 678) Not offered 1979–80.]

Seminar on the Vietnam War (Government 300)

Government and Politics of Southeast Asia (Government 344)

[Political Role of the Military (Government 349) Not offered 1979–80.]

Political Problems of Southeast Asia (Government 652)

Southeast Asian History to the Fourteenth Century (History 395)

[Southeast Asian History from the Fifteenth Century (History 396) Not offered 1979–80.]

[Undergraduate Seminar in Southeast Asia in the Nineteenth Century (History 497) Not offered 1979–80.]

Undergraduate Seminar in Southeast Asian History (History 498)

Historiography of Southeast Asia (History 695–696)

Seminar in Southeast Asian History (History 795–796)

Art in Landscape (History of Art 106)

[Studies in Indian and Southeast Asian Art (History of Art 386) Not offered 1979–80.]

[Traditional Arts in Southeast Asia (History of Art 488) Not offered 1979–80.]

[Problems of Art Criticism (History of Art 596) Not offered 1979–80.]

Seminar on Agricultural Development in Southeast Asia (International Agriculture 601)

[History of Asian Architecture (Architecture) Not offered 1979–80.]

Administration of Agricultural and Rural Development (International Agriculture 603)

Special Studies of Problems of Agriculture in the Tropics (International Agriculture 602)

Comparative Thai (Linguistics 578)

Field Methods (Linguistics 600)

[Old Javanese (Linguistics 651–652) Not offered 1979–80.]

Seminar in Southeast Asian Languages (Linguistics 653–654)

[Malayo-Polynesian Linguistics (Linguistics 655–656) Not offered 1979–80.]

[Seminar in Austro-Asiatic Linguistics (Linguistics 657–658) Not offered 1979–80.]

Directed Research (Linguistics 701–702)

[Thai Dialectology (Linguistics 751) Not offered 1979–80.]

Comparative Thai (Linguistics 752)

[Tibeto-Burman Linguistics (Linguistics 753) Not offered 1979–80.]

Gamelan Ensemble (Music 446)

Rural Development and Cultural Change (Rural Sociology 355)

[Subsistence Agriculture in Transition (Rural Sociology 357) Not offered 1979–80.]

Peasants, Water, and Development (Rural Sociology 754)

Related Courses in Other Departments

Literature and Social Change in Historical Perspective (Society for the Humanities 426)

Other courses dealing extensively with Southeast Asia are: Anthropology 306, 320, 420, 425, 608, 611, 619, 628; Agricultural Economics 464, 701; Agricultural Engineering 666, 771; Agronomy 401, 480; Architecture 667–668; Asian Studies 250, 351, 650; Communication Arts 624, 626; Education 627; Government 348, 350, 387, 605, 647, 687;

Economics 372–572, 678; History 190, 191; History of Art 280, 482, 580; International Agriculture 600, 602, 603, 703; Law 535; Rural Sociology 157, 358, 650, 754, 971; and Nutritional Sciences 680, 695.

Southeast Asia—Language Courses

Basic Course (Burmese 101–102)

Burmese Reading (Burmese 201–202)

Composition and Conversation (Burmese 203–204)

Advanced Burmese Reading (Burmese 301–302)

[Basic Course (Cambodian 101–102) Not offered 1979–80.]

[Cambodian Reading (Cambodian 201–202) Not offered 1979–80.]

[Composition and Conversation (Cambodian 203–204) Not offered 1979–80.]

[Advanced Cambodian (Cambodian 301–302) Not offered 1979–80.]

[Directed Individual Study (Cambodian 401–402) Not offered 1979–80.]

[Structure of Cambodian (Cambodian 404) Not offered 1979–80.]

[Basic Course (Cebuano Bisayan 101–102) Not offered 1979–80.]

Basic Course (Indonesian 101–102)

Indonesian Reading (Indonesian 201–202)

Composition and Conversation (Indonesian 203–204)

[Linguistic Structure of Indonesian (Indonesian 300) Not offered 1979–80.]

Readings in Indonesian and Malay (Indonesian 301–302)

Advanced Indonesian Conversation and Composition (Indonesian 303–304)

[Advanced Readings in Indonesian and Malay Literature (Indonesian 305–306) Not offered 1979–80.]

[Linguistic Structure of Indonesian (Indonesian 403–404) Not offered 1979–80.]

FALCON (full-time intensive course, Indonesian 161–162)

Elementary Javanese (Javanese 131–132)

Intermediate Javanese (Javanese 133–134)

[Basic Course (Tagalog 101–102) Not offered 1979–80.]

Tagalog Reading (Tagalog 201–202)

[Linguistic Structure of Tagalog (Tagalog 300) Not offered 1979–80.]

Basic Course (Thai 101–102)

Thai Reading (Thai 201–202)

Composition and Conversation (Thai 203–204)

Advanced Thai (Thai 301–302)

Thai Literature (Thai 305–306)

Directed Individual Study (Thai 401–402)

Basic Course (Vietnamese 101–102)

Vietnamese Reading (Vietnamese 201–202)

Composition and Conversation (Vietnamese 203–204)

Advanced Vietnamese (Vietnamese 301–302)

Directed Individual Study (Vietnamese 401–402)

Astronomy

101 The Universe Beyond the Solar System Fall. 4 credits. Prerequisite: high school algebra.
Lec, M W F 11:15; lab, M, T, or W 7:30–10 p.m.
Y. Terzian, F. Drake.
An examination of the universe and our place in it, and the possible existence of life and intelligence elsewhere in the cosmos. The physical nature of stars, galaxies, and quasi-stellar sources. The birth, evolution, and death of stars and the formation of the chemical elements, including discussions of supernovae, pulsars, neutron stars, and black holes. The physical state, composition, and influence of the interstellar material on the evolution of our galaxy. Modern theories of the structure and evolution of the universe.

102 The Solar System and Earth Spring. 4 credits. Prerequisites: high school algebra and Astronomy 101 or consent of instructor.
Lec, M W F 11:15; lab, M, T, or W 7:30–10 p.m.
Exams will be given in the evening. J. Veverka.
Formation of the solar system. Environments and internal structures of planets. Formation and structure of the earth and its atmosphere, and the evolution of the earth's surface and climate. Origin of life. The effects of civilization on our planet.

103 The Universe Beyond the Solar System Fall. 3 credits. This course does not satisfy the distribution requirement in physical sciences.
Identical to 101 except for omission of the laboratory (see description above).

104 The Solar System and Earth Spring. 3 credits. This course does not satisfy the distribution requirement in physical sciences.
Identical to 102 except for omission of the laboratory (see description above).

111 Theories of the World: Stars, Galaxies, and Cosmology Spring. 4 credits. Intended for engineering and physical sciences freshmen. Prerequisite: introductory calculus or coregistration in Mathematics 111 or 191.
Lec, M W F 10:10; rec, one hour each week to be arranged; plus some evening observing periods.
J. R. Houck.
The formation and evolution of stars. Supernovae, pulsars, quasars, and black holes. The interstellar medium. The structure and evolution of galaxies. Cosmology.

112 Theories of the World: The Solar System, Planets, and Life Fall. 4 credits. Intended for engineering and physical sciences freshmen. Prerequisite: introductory calculus or coregistration in Mathematics 111 or 191.
Lec, M W F 10:10; rec, one hour each week to be arranged; and some evening labs to be arranged.
J. Burns.
The origin of the solar system. Celestial mechanics. The physics of planetary atmospheres, surfaces, and interiors. Spacecraft results. Prebiology and the origin of life. The detection of life elsewhere in the universe.

201 Our Home in the Universe Fall. 2 credits. S-U grades only. No prerequisites.
T R 2:30. T. Gold.
A general discussion of man's relation to the physical universe; the nature of space and time as understood in modern physics; the universe of galaxies and stars, and the particular system of planets and satellites encircling one average such star, our sun. The origin and evolution of our solar system, as revealed by modern planetary exploration. The great uncertainties that remain.

215 Information and Knowledge in Science and Engineering (also Arts and Sciences 200) Fall. 4 credits. No prerequisites.
T R 10:10–11:35. M. Harwit.
Topics to be covered include: the exact and probabilistic laws of nature; messages, information content, and entropy; the Heisenberg uncertainty principle as a fundamental limitation on what we can know about the behavior of physical systems; coding of messages, cryptography, unbreakable codes, error correcting codes; self-replicating machines; transmission of genetic information in biology; mutations and biological evolution; transmission, storage, and processing of information in machines and in animals; robots and artificial intelligence; transmission of information across the universe—astronomical data and communication with intelligent civilizations. Level of *Scientific American*.

332 Elements of Astrophysics Spring. 4 credits. Prerequisites: calculus and elementary physics.
Lec, M W F 10:10; optional rec, W 1:25.
S. Beckwith.
An introduction to astronomy with emphasis on the application of physics to the study of the universe. Physical laws of radiation. Theories of the solar system. Distance, size, mass, and age of stars, galaxies, and the universe; stellar evolution and nucleosynthesis; interstellar matter and star formation. Supernovae, pulsars, and black holes. Galaxies and quasars. Introduction to cosmology. Intended for students interested in astronomy, physics, and engineering.

431 Introduction to Astrophysics and Space Sciences I Fall. 4 credits. Prerequisites: Physics 214 and 318 or their equivalent. There are no astronomy course prerequisites.
M W F 10:10. J. R. Houck.
A systematic development of modern astrophysical concepts for physical science majors. The cosmic distance scale; dynamics and masses of astronomical bodies; atomic and electromagnetic processes in space. Introduction to star formation, stellar structure, stellar atmospheres, and the interstellar medium. At the level of *Astrophysical Concepts* by Harwit.

432 Introduction to Astrophysics and Space Science II Spring. 4 credits. Prerequisite: Astronomy 431 or permission of instructor.
M W F 10:10. M. Harwit, J. Cordes, S. Ostro.
Formation of the chemical elements. Origin of the solar system; interstellar dust and gas, cosmic rays; stellar systems, clusters; galaxies and quasars. Cosmology. Exobiology. Emphasis is on the formation of stars, galaxies, and the solar system. At the level of *Astrophysical Concepts* by Harwit.

[433 The Sun Fall. Not offered 1979–80; next offered 1980–81.]

[434 Evolution of Planets Spring. Not offered 1979–80; next offered 1980–81.]

440 Independent Study in Astronomy Fall or spring. 2–4 credits. Prerequisite: consent of instructor. Familiarity with the topics covered in Astronomy 332, 431, or 434 is recommended.
Hours to be arranged. Staff.
Individual work on selected topics. A program of study is devised by the student and instructor.

490 Senior Seminar Fall. 2 credits. S-U grades only. Intended primarily for physical science majors in their senior year. Prerequisites: Physics 214 and 318 or their equivalents.
Hours to be arranged. S. Beckwith.
Selected topics of modern astronomy and astrophysics.

[509 General Relativity (also Physics 553) Fall. Not offered 1979–80; next offered 1980–81.]

[510 Applications of General Relativity (also Physics 554) Spring. Not offered 1979–80; next offered 1980–81.]

[511 High Energy Astrophysics Spring. Not offered 1979–80; next offered 1980–81.]

516 Galactic Structure and Stellar Dynamics Spring. 4 credits.
T R 10:10–11:30. S. Shapiro.
The physics of white dwarfs, neutron stars, and black holes. The formation of compact objects; neutrino and gravitational radiation from supernova collapse. Equilibrium configurations, equations of state, stability criteria and mass limits; the influence of rotation and magnetic fields. Pulsar phenomena. Mass flow in binary systems; spherical and disk accretion; high temperature radiation processes. Compact x-ray sources and x-ray bursts.

520 Radio Astronomy Fall. 4 credits.
T R 2:30–4. F. Drake, J. Cordes, S. Ostro.
Radio astronomy telescopes and electronics; antenna theory; observing procedures and data analysis; concepts of interferometry and aperture synthesis. Radar astronomy techniques. Theories of radio emission; synchrotron emission and thermal emission; applications to the theory of radio sources. Radio astronomy of the solar system.

521 Radio Astrophysics Spring. 4 credits.
T R 2:30–4. Y. Terzian, J. Cordes, S. Ostro.
Thermal and nonthermal radiation processes. Interstellar emission, reflection, dark nebulae. Planetary nebulae, novae, supernova shells, pulsars. Galactic 21-cm emission, galactic structure, kinematics. Radio emission from normal and abnormal galaxies. Observations and theories of quasi-stellar objects. Universal background radiation. Cosmological models.

[525 Observational Techniques of Optical Astronomy Spring. Not offered 1979–80; next offered 1980–81, if there is sufficient demand.]

[555 Theory of the Interstellar Medium Fall. Not offered 1979–80; next offered 1980–81.]

560 Theory of Stellar Structure and Evolution (also Physics 667) Fall. 4 credits.
M W F 2:30. S. Salpeter.
Summary of observational facts on stars; dimensional analysis; nuclear reactions and energy transport in stellar interiors; models for static and evolving stars. At the level of *Principles of Stellar Evolution and Nucleosynthesis* by Clayton.

[570 Physics of the Planets Fall. Not offered 1979–80; next offered 1980–81.]

571 Mechanics of the Solar System (also Engineering T&AM 673) Spring. 3 credits. Prerequisite: undergraduate course in classical mechanics.
Lec; hours to be arranged. J. Burns.
Gravitational potentials, planetary gravity fields. Free and forced rotations, Chandler wobble, polar wander, damping of nutation. Equilibrium tidal theory, tidal heating. Orbital evolution of natural satellites, resonances, spin-orbit coupling, Cassini states. Long-term variations in planetary orbits. Dust dynamics. Dynamics of ring systems. Physics of interiors, seismic waves, free oscillations. Illustrative examples are drawn from contemporary research.

[575 Radiative Transfer and Planetary Atmospheres Spring. Not offered 1979–80; next offered 1980–81.]

[579 Celestial Mechanics (also Engineering T&AM 672) Spring. Not offered 1979–80; next offered 1980–81.]

[620 Seminar: Advanced Radio Astronomy Spring. Not offered 1979–80; next offered 1980–81.]

[633 Seminar: Infrared Astronomy Spring, upon sufficient demand. 2 credits.
M. Harwit, J. R. Houck, and S. Beckwith.
Techniques of modern infrared astronomical observation; emission mechanisms of cosmic infrared radiation; infrared observations of planets, stars, nebulae, galaxies, and cosmic background radiation.]

640 Advanced Study and Research Fall or spring. Credit to be arranged.
Hours to be arranged. Staff.
Guided reading and seminars on topics not currently covered in regular courses.

660 Cosmic Electrodynamics (also Engineering A&EP 608) Spring. 2 credits.
Hours to be arranged. R. Lovelace.
Selected topics discussed in detail; the solar corona and wind; extra-galactic radio sources; magnetized accretion discs; and modes and instabilities of self-gravitating systems.

671 Special Topics in Planetary Astronomy Fall. 3 credits.
T R 1:25–2:15. J. Veverka.
Investigations of Jupiter and its satellites, including recent results from the Voyager missions.

671 Special Topics in Planetary Astronomy Spring. 3 credits.
Hours to be arranged. C. Sagan
Topics vary. The course has focused on such topics as the interiors of planets; Martian exploration; cosmic chemistry and exobiology; and instrumental techniques.

[673 Seminar: Current Problems in Planetary Fluid Dynamics Spring. Not offered 1979–80; next offered 1980–81.]

[680 Seminar: Cosmic Rays and High-Energy Electromagnetic Radiation (also Physics 680) Spring. Not offered 1979–80; next offered 1980–81.]

699 Seminar: Current Problems in Theoretical Astrophysics Fall. 3 credits. May be repeated for credit.
T R 10:10–11:35. S. Shapiro.
Study of the latest problems in theoretical astrophysics; contents change from year to year.

Biological Sciences

See page 129.

Chemistry

Preliminary examinations for all courses may be given in the evening.

103–104 Introduction to Chemistry 103, fall; 104, spring. 3 credits each term. Prerequisite for Chemistry 104: Chemistry 103. Enrollment limited. Recommended for students who have not had high school chemistry and for those needing a less mathematical course than Chemistry 207–208.
Lec, M W 11:15 or 12:20; lab, T or R 8–11, or F 10:10–1:10, or M, W, or F 1:25–4:25. Fall.
H. A. Scheraga; spring, B. K. Carpenter.
An introduction to chemistry with emphasis on the important principles and facts of inorganic and organic chemistry.

[200 Man in his Chemical Environment Fall. 3 credits. Prerequisites: 103–104 or 207–208. Enrollment limited. Offered alternate years. Not offered 1979–80.
Lec, T R 12:20; rec, T 1:25 or R 10:10 or 1:25.
F. W. McLafferty.
The chemical aspects of the human environment, including the composition and properties of materials as these affect our environment. Chemical limitations on the balance between survival and quality of living.]

207–208 General Chemistry 207, fall; 208, spring. 4 credits each term. Enrollment limited. Recommended for those students who will take further courses in chemistry. Prerequisite: high school chemistry; Chemistry 207 or 103–104 is prerequisite to Chemistry 208.
Lec: fall, T R 9:05, 10:10, or 12:20; spring, T R 9:05 or 10:10. Lab: fall, T W R S 8–11; F 10:10–1:10; M T W R or F 1:25–4:25; spring, M T W R F 12:20–4:25, or S 8–12. Fall, R. C. Fay, M. J. Sienko; spring, R. C. Fay.
The important chemical principles and facts are covered, with considerable attention given to the quantitative aspects and to the techniques important for further work in chemistry. Second-term laboratory includes a systematic study of qualitative analysis.

Note: Entering students exceptionally well prepared in chemistry may receive advanced placement credit for Chemistry 207–208 by demonstrating competence in the advanced placement examination of the College Entrance Examination Board or in the departmental examination given at Cornell before classes start in the fall.

215–216 General Chemistry and Inorganic Qualitative Analysis 215, fall; 216, spring. Fall, 4 credits; spring, 5 credits. Recommended for students who intend to specialize in chemistry or in closely related fields. Prerequisites: good performance in high school chemistry and physics and in mathematics SAT. Coregistration in a calculus course at the level of Mathematics 111 or 191 is required for students who have not taken high school calculus. Prerequisite for Chemistry 216: Chemistry 215. Enrollment limited.
Fall: lec, M W F 12:20; lab, M, T, W, R, or F 1:25–4:25. Spring: lec or rec, M W F 12:20; two labs, M T 1:25–4:25, T R 10:10–1:10, W F 1:25–4:25, or R 1:25–4:25 and S 8–11. Fall, G. G. Hammes; spring, L. Que.
An intensive systematic study of the laws and concepts of chemistry, with considerable emphasis on quantitative aspects. Second term includes systematics of inorganic chemistry. Laboratory work covers both qualitative and quantitative analysis.

251 Introduction to Experimental Organic Chemistry Fall. 2 credits. Recommended for nonchemistry majors. Prerequisite or corequisite: 253 or 357 or permission of instructor.
Lec, M 8; lab, M, T, W, or R 1:25–4:25, or T or R 8–11. J. R. Rasmussen.
An introduction to synthesis and the separation and handling of materials including applications of many types of chromatography, simple and fractional distillation, crystallization, extraction, and others.

252 Elementary Experimental Organic Chemistry Spring. 2 credits. Recommended for nonchemistry majors. Prerequisite: Chemistry 251.
Lec, M 8; lab, M, T, W, or R 1:25–4:25. J. Meinwald.
A continuation of Chemistry 251.

253 Elementary Organic Chemistry Fall. 4 credits. Primarily for students in the premedical and biological curricula. Prerequisite: Chemistry 104 with grade of C or better and Chemistry 208 or 216. Enrollment limited to 480 students.
Lec, M W F S 10:10; make-up lec may be given in the evening. D. A. Usher.

The occurrence and properties of organic molecules and the mechanisms of organic reactions, including a brief introduction to the organic chemistry of biological systems, are studied.

Note: Premedical students should determine the entrance requirements of the particular medical school they wish to enter. Students may earn 6 credits by taking Chemistry 251–253 or 8 credits by taking Chemistry 253–301 or 253, 251, and 252.

255 Elementary Organic Chemistry Fall or spring. 2 credits. Prerequisite: Chemistry 357. For students wanting to strengthen their background in organic chemistry without taking Chemistry 358.

Lec, M W F S 10:10.

Chemistry 255 is identical to Chemistry 253 but offered only to those students who have already covered a substantial portion of the material in Chemistry 357.

287–288 Introductory Physical Chemistry 287, fall; 288, spring. 3 credits each term. Prerequisites: Chemistry 208 or 216 and Mathematics 111–112, or permission of instructor. Prerequisite for Chemistry 288: Chemistry 287.

Lec, M W F 9:05; rec, M, W, or F 1:25. Fall, E. R. Grant; spring, P. L. Houston.

A systematic treatment of the fundamental principles of physical chemistry.

289–290 Introductory Physical Chemistry Laboratory 289, fall; 290, spring. 2 credits each term. Prerequisite for Chemistry 290: Chemistry 289. Coregistration in 287–288 is required.

Lab-lec, W 7:30 p.m.; two labs, M T or W R 1:25–4:25 or, if warranted by sufficient registration, F 1:25–4:25 and S 8–11. First hours of lab on M W F devoted to Chemistry 287 recitation. Fall, J. R. Wiesenfeld; spring, E. R. Grant.

Quantitative and qualitative methods basic to the experimental study of physical chemistry.

300 Quantitative Chemistry Fall. 2 credits. Prerequisite: Chemistry 208 or advanced placement in chemistry.

Lec, F 12:20; lab, M, T, W, R, or F 1:25–4:25 or T R 8–11. Organizational meeting on first class day of semester, 12:20. G. H. Morrison.

Common quantitative procedures and techniques essential to laboratory work in the sciences are emphasized. The relationships between theories and applications are stressed.

301 Experimental Chemistry I Spring. 4 credits. Prerequisite: Chemistry 216 or 300, and 253 or 357 or 359. Concurrent registration in Chemistry 253 is not recommended.

Lec, M W 8; 2 labs, M W 1:25–4:25 or T R 8–11, or T R 1:25–4:25. J. R. Rasmussen.

An introduction to synthesis and the separation and handling of materials, including applications of many types of chromatography, simple and fractional distillation, crystallization, extraction, and others.

302 Experimental Chemistry II Fall. 4 credits. Prerequisite: Chemistry 301. Enrollment limited; preference given to chemistry majors.

Lec, M W 9:05; 2 labs, M W 1:25–4:25, T R 9–12, or T R 1:25–4:25. J. M. Burlitch, B. Ganem.

Various aspects of qualitative and quantitative analysis of both inorganic and organic compounds, including optical spectroscopy, NMR, mass spectroscopy, statistical analysis of data, and electrochemical methods are surveyed.

303 Experimental Chemistry III Spring. 4 credits. Prerequisites: Chemistry 302, 389, and coregistration in Chemistry 390; knowledge of computer programming is essential. Each lab limited to 18 students.

Lec, M W 9:05 (some weeks lec may be on F instead of W); 2 labs M W 1:25–4:25 or T R 8–11 or 1:25–4:25. R. F. Porter.

An introduction to the techniques of vacuum line construction and operation; the principles and assembly of electronic measuring devices, optics, and kinetics.

357–358 Introductory Organic Chemistry 357, fall; 358, spring. 3 credits each term. Prerequisites: Chemistry 208 or 216 or advanced placement in chemistry. Concurrent registration in Chemistry 251 in the fall term and Chemistry 301 in the spring term is recommended. Prerequisite for Chemistry 358: Chemistry 357.

Lec, M W F 9:05. Optional rec may be offered. Fall, J. Meinwald; spring, J. C. Clardy.

A systematic study of the more important classes of carbon compounds — reactions of their functional groups, methods of synthesis, relations, and uses.

359–360 Organic Chemistry I and II 359, fall; 360, spring. 4 credits each term. Recommended for students who intend to specialize in chemistry or closely related fields. Prerequisites: Chemistry 216, or 208 with a grade of B or better, or consent of the instructor. Prerequisite for Chemistry 360: Chemistry 359. Enrollment limited.

Lec, M W F 9:05; make-up lecs, W 7:30 p.m. M. J. Goldstein.

A rigorous and systematic study of organic and organometallic compounds, their structures, the mechanisms of their reactions, and the ways that they are synthesized in nature and in the laboratory.

389–390 Physical Chemistry I and II 389, fall; 390, spring. 4 credits each term. Prerequisites: Mathematics 214, 215, 216, or ideally, 221–222; Physics 208; Chemistry 208 or 216 or permission of instructor. Prerequisite nor Chemistry 390: Chemistry 389.

Lec, M W F 10:10; rec and make-up lec, W 7:30 p.m. Exams: fall, R 7:30 p.m.; spring, T or R 7:30 p.m. Fall, R. Hoffmann; spring, M. E. Fisher.

The principles of physical chemistry are studied from the standpoint of the laws of thermodynamics, kinetic theory, and quantum chemistry. At the level of *Thermal Properties of Matter* by W. L. Kauzmann and *Quantum Mechanics in Chemistry* by M. W. Hanna.

404 Advanced Measurements Laboratory Fall. 4 credits. Prerequisite: Chemistry 303.

Lab, M T R 1:25–4:25; plus occasional evening lec. Alternate hours may be arranged if necessary. R. F. Porter.

Applications of modern experimental techniques in a variety of fields. Emphasis is on kinetics, spectroscopy, and electronics.

405 Techniques of Modern Synthetic Chemistry Spring. 4 credits. Prerequisite: Chemistry 302. Enrollment limited. Selection of students will be based on grades in Chemistry 301 and 302. With permission of the instructor, graduate students may perform a minimum of three two-week experiments on a prearranged schedule.

Lab time required: 12 hours each week including at least 2 four-hour sessions in 2 sections (M W 1:25 or T R 1:25). First meeting will be at 4:30 p.m. on first class day of semester. Lec, first week only, at times to be arranged. J. M. Burlitch.

The syntheses of complex organic and inorganic molecules will be carried out with emphasis on the following techniques: vacuum line, high pressure, high temperature solid state, inert atmosphere, nonaqueous solvents, radioactive labeling, photochemical and electrochemical methods, solid phase peptide synthesis, and macro and micro techniques. Elementary glassblowing.

421 Introduction to Inorganic Research Fall or spring. 2–4 credits. Prerequisites: Chemistry 303 and 389–390, or Chemistry 287–288, and Chemistry 289–290 with an average of B– or better, or permission of instructor.

Selected faculty.

Informal advanced laboratory and library work, planned in consultation with a staff member, preparing and characterizing inorganic substances and culminating in a written report.

433 Introduction to Analytical Research Fall or spring. 2–4 credits. Prerequisites: Chemistry 303 and 390 with an average of B– or better or permission of instructor.

Selected faculty.

Informal research in analytical chemistry involving both laboratory and library work.

461 Introduction to Organic Research Fall or spring. 2–4 credits. Enrollment limited to those having a record of B– or better in prerequisite courses. Prerequisites: Chemistry 302 and 358 or 360 or permission of instructor.

Selected faculty.

Informal research in organic chemistry involving both laboratory and library work.

477 Introduction to Research in Physical Chemistry Fall or spring. 2–4 credits. Prerequisites: Chemistry 390 with an average of B– or better and permission of instructor.

Selected faculty.

Informal laboratory and library work in physical chemistry, planned in consultation with a staff member.

498 Honors Seminar Spring. Noncredit. Prerequisite: permission of instructor. Additional prerequisite or corequisites: outstanding performance in either (1) two coherent 4-credit units of research in a course such as Chemistry 421, 433, 461, or 477; or (2) one 4-credit unit in a course such as Chemistry 421, 433, 461, or 477 *and* summer research equivalent to at least 4 credits in the same subject.

G. H. Morrison.

Informal presentations and discussions of selected topics in which all students participate. Individual research is on advanced problems in chemistry under the guidance of a staff member, culminating in a written report.

600 General Chemistry Colloquium Fall and spring. Noncredit. Required of all graduate students except those majoring in organic or bioorganic chemistry. Open to qualified juniors and seniors.

R 4:40.

A series of talks representative of all fields of current research interest in chemistry other than organic chemistry, given by research associates, faculty members, and distinguished visitors.

605 Advanced Inorganic Chemistry I: Symmetry and Structure Fall. 4 credits. Prerequisite: Chemistry 389–390 or equivalent or permission of instructor.

Lec, M W F 11:15. L. Que.

This is the first of a three-term sequence. Symmetry and structure of discrete molecules, translational symmetry of arrays of molecules in crystals. Group theory at the level of Cotton's *Chemical Application of Group Theory*, Schonland's *Molecular Symmetry*, and Hall's *Group Theory and Symmetry in Chemistry*. Applications include molecular orbital theory, hybridization, and molecular vibrations. Readings in the chemistry of nontransition elements at the level of Cotton and Wilkinson's *Advanced Inorganic Chemistry*.

[606 Advanced Inorganic Chemistry II: Structure and Dynamics Spring. 4 credits. Prerequisite: Chemistry 605 or permission of instructor. Not offered 1979–80.

Lec T R 8–9:55.

The second of a three-term sequence. The development of general background and systematics through which structure, stereochemistry, and reaction mechanism of organometallic compounds can be understood and anticipated. Readings at the

level of Coates, Green, and Wade's *Organometallic Compounds* and Basolo and Pearson's *Inorganic Reaction Mechanisms*.]

607 Advanced Inorganic Chemistry III: Structure and Properties Spring. 4 credits. Prerequisite: 605 or permission of instructor.
Lec, M W F 11:15. M. J. Sienko.
The third of a three-term sequence. Introduction to ligand field theory and solid-state structure and properties, at the level of Figgis' *Introduction to Ligand Fields*, Kreb's *Fundamentals of Inorganic Crystal Chemistry* and Sach's *Solid State Theory*. Readings in transition metal chemistry at the level of Cotton and Wilkinson's *Advanced Inorganic Chemistry*.

622 Chemical Communication (also Biological Sciences 623) Fall. 3 credits. Intended primarily for research-oriented students. Prerequisites: Chemistry 358, Biological Sciences 102, and Biochemistry 231. Enrollment limited to 30 students. Offered alternate years.
Lec, M W F 1:25. J. Meinwald, T. Eisner, W. Roelofs, and guest speakers.
The production, transmission, and reception of chemical signals in communicative interactions of animals, plants, and microorganisms. Communication involving insects is emphasized. Specific topics are treated, with varying emphasis on chemical, biochemical, neurobiological, ecological, and evolutionary principles.

625 Advanced Analytical Chemistry I Fall. 4 credits. Open to undergraduates with permission of instructor. Prerequisite: Chemistry 288 or 390 or equivalents.
Lec, M W F 8; exams, T 7:30 p.m. W. D. Cooke, F. W. McLafferty.
The application of molecular spectroscopy to chemical problems. Topics in ultraviolet, infrared, NMR, Raman, and mass spectroscopy are discussed.

627 Advanced Analytical Chemistry II Spring. 3 credits. Primarily for graduate students. Prerequisite: Chemistry 288 or 390 or equivalent. Offered alternate years.
Lec, T R 9:05; problem sessions and exams, T 7:30. F. W. McLafferty.
Modern analytical methods, including electron, Mössbauer, and Fourier spectroscopy; mass spectrometry; methods applicable to macromolecules; information theory.

[628 Advanced Analytical Chemistry III Spring. 3 credits. Primarily for graduate students. Prerequisite: Chemistry 288 or 390 or equivalents. Offered alternate years. Not offered 1979–80.
Lec, T R 9:05. G. H. Morrison.
Modern trace, micro, and surface methods of analysis, including atomic spectrometry, solids mass spectrometry, activation analysis, microscopes, microprobes, and electron spectroscopy.]

650–651 Organic and Inorganic Chemistry Seminar 650, fall; 651, spring. Noncredit. Required of all graduate students majoring in organic or bioorganic chemistry. Open to qualified juniors and seniors.
M 8:15 p.m.
A series of talks representative of all fields of current research interest in organic chemistry, given by research associates, faculty members, and distinguished visitors.

665 Advanced Organic Chemistry Fall. 4 credits. Primarily for graduate students and upperclass undergraduates. Prerequisites: Chemistry 253 or 358 or 360 and 390 or equivalents or permission of instructor.
Lec, M W F 12:20; make-up lectures and exams, W 7:30 p.m. B. K. Carpenter.
An analysis of the simplest organic reactions. The principal aim is to provide the student with the skills and background needed to predict the reactivity patterns and stereochemical preferences of new molecules in a variety of experimental environments.

666 Synthetic Organic Chemistry Spring. 4 credits. Primarily for graduate students and upperclass undergraduates. Prerequisites: Chemistry 665 or permission of instructor.
Lec, T R 8:00–9:30; an additional lec may be arranged. B. Ganem.
Modern techniques of synthesis; applications of organic reaction mechanisms to the problems encountered in rational multistep synthesis, with particular emphasis on modern developments in synthetic planning.

[668 Chemical Aspects of Biological Processes Fall. 4 credits. Prerequisites: Chemistry 358 or 360 and 390 or 288 or equivalents. Not offered 1979–80.
Lec, M W F 10:10. D. A. Usher.
Biochemical systems, bioenergetics, enzymes, metabolic pathways, chemical evolution. This course forms the chemical basis for the graduate program in molecular biology.]

[672 Enzyme Catalysis and Regulation Spring. 4 credits. Primarily for graduate students in chemistry and biochemistry. Prerequisites: Chemistry 358 or 360 and 390 or equivalents, and a course in general biochemistry. Not offered 1979–80.
Lec, M W F 11:15 and occasional lec, W 7 p.m. G. G. Hammes.
Protein structure and dynamics, steady state and transient kinetics, binding isotherms, chemical modification of enzymes, application of NMR, EPR, and fluorescence, acid-base catalysis, allosterism; discussion of specific enzymes to illustrate general principles.]

677 Chemistry of Nucleic Acids Spring. 4 credits. S-U grades only. Primarily for graduate students. Prerequisites: Chemistry 358 or 360, and 390 or equivalents. Offered alternate years.
Lec, M W F 8. D. A. Usher.
Properties, synthesis, and reaction of nucleic acids.

678 Thermodynamics Spring. 4 credits. Primarily for graduate students. Prerequisite: 288 or 390 or equivalents.
Lec, T R 8:30–9:55; disc, to be arranged. J. H. Freed.
Development of the general laws of equilibrium and nonequilibrium thermodynamics and investigation of their statistical basis. Applications to the study of physicochochemical equilibrium and steady states in gases, liquids, solids, and liquid solutions.

681 Physical Chemistry III Fall. 4 credits. Prerequisites: Chemistry 288 or 390; Mathematics 214, 215, 216, 217, and Physics 208; or equivalents.
Lec, M W F 10:10, occasional lectures W 7:30 p.m. J. H. Freed.
An introduction to the principles of quantum theory and statistical mechanics, atomic and molecular spectra, and elementary valence theory. At the level of *Atoms and Molecules* by Karplus and Porter.

[686 Physical Chemistry of Proteins Spring. 4 credits. Primarily for graduate students. Prerequisites: Chemistry 288 or 390 or equivalents. Offered alternate years. Not offered 1979–80.
Lec, M W F 8, S 11:15, and occasionally W 7:30 p.m. H. A. Scheraga.
Chemical constitution, molecular weight, and structural basis of proteins; thermodynamic, hydrodynamic, optical, and electrical properties; protein and enzyme reactions; statistical mechanics of helix-coil transition in biopolymers; conformation of biopolymers: protein folding.]

700 Baker Lectures Fall, on dates to be announced. Noncredit.
C. N. Reilley, University of North Carolina.
Distinguished scientists who have made significant contributions to chemistry present lectures for periods varying from a few weeks to a full term.

701–702 Introductory Graduate Seminar in Analytical, Inorganic, and Physical Chemistry 701, fall; 702, spring. Noncredit. Required of all first-year graduate students majoring in analytical, inorganic, physical, theoretical and biophysical chemistry.
Hours to be arranged. D. A. Usher.

[716 Selected Topics in Advanced Inorganic Chemistry Fall. 3 credits. S-U grades only. Prerequisite: Chemistry 390 or equivalent. Not offered 1979–80.
Lec, T R 12:20.
Topics vary.]

765 Physical Organic Chemistry I Spring. 4 credits. Primarily for graduate students. Prerequisite: Chemistry 665 or permission of instructor.
Lec, M W 8; an additional lec to be arranged; make-up lec, W 7:30 p.m. C. F. Wilcox.
Continues and extends the approach of Chemistry 665 to more complicated organic reactions. Emphasis is on applications of reaction kinetics and isotope effects to gain an understanding of reaction mechanisms.

[766 Physical Organic Chemistry II Spring. 3 credits. Primarily for graduate students. Prerequisite: Chemistry 765 or permission of instructor. Not offered 1979–80.
Quantitative aspects of organic chemistry.]

770 Selected Topics in Organic Chemistry Fall. 3 credits. Primarily for graduate students. Prerequisites: Chemistry 665–666 or permission of instructor.
Lec, M W 11:15. C. F. Wilcox.
Topics vary.

774 Chemistry of Natural Products Spring. 3 credits. Primarily for graduate students. Prerequisites: Chemistry 665–666.
Lec, T R 12:20.
Particular attention is devoted to methods of structure determination and synthesis as applied to selected terpenes, steroids, alkaloids, and antibiotics.

780 Principles of Chemical Kinetics Fall. 4 credits. Prerequisite: Chemistry 681 or permission of instructor.
Lec, M W F 9:05 and occasionally T 7 p.m. P. L. Houston.
Principles and theories of chemical kinetics; special topics such as fast reactions in liquids, enzymatic reactions, energy transfer, and molecular beams.

782 Special Topics in Biophysical and Bioorganic Chemistry Spring. Noncredit. Primarily for graduate students.
Lec, T R 11:15. Dates to be announced.
Topics, which are presented by distinguished visitors, vary from year to year.

789 X-ray Crystallography Spring. 4 credits. Prerequisite: Chemistry 288 or 390 or permission of instructor.
Meeting times to be arranged. Offered only when sufficient registration warrants. R. E. Hughes.
A beginning course in the application of x-ray crystallography to structural chemistry. Topics include symmetry properties of crystals, diffraction of x-rays by crystals, interpretation of diffraction data and refinement of structures. The chemical information available from a diffraction experiment is stressed and theoretical aspects are illustrated by conducting an actual structure determination as a classroom exercise. At the level of Ladd and Palmer's *Structure Determination by X-ray Crystallography*.

793 Quantum Mechanics I Fall. 4 credits. Prerequisites: Chemistry 681, coregistration in Mathematics 421, and Physics 431 or equivalents or permission of instructor.
Lec, T R S 9:05. R. E. Hughes.

Schrödinger's equation, wave packets, uncertainty principle, WKB theory, matrix mechanics, orbital and spin angular momentum, exclusion principle, perturbation theory, variational principle, Born-Oppenheimer approximation. At the level of Bohm's *Quantum Theory*.

794 Quantum Mechanics II Spring. 4 credits. Prerequisites: Chemistry 793 or equivalent and coregistration in Physics 432 and Mathematics 422, or permission of instructor.
Lec, M W F 10:10. R. Hoffmann.
Time-dependent phenomena in quantum mechanics and interaction with radiation. Spectroscopy. Elementary theory of ESR and NMR. Electronic structure of atoms and molecules.

796 Statistical Mechanics (also Physics 562) Spring. 4 credits. Primarily for graduate students. Prerequisite: Chemistry 793 or equivalent.
Lec, T R 8:30–9:50. B. Widom.
Ensembles and partition functions. Thermodynamic properties of ideal gases and crystals. Third law of thermodynamics, equilibrium constants, vapor pressures, imperfect gases, and virial coefficients. Distribution and correlation functions, structure and properties of liquids. Lattice statistics and phase transitions. Bose-Einstein and Fermi-Dirac ideal gases. At the level of McQuarrie's *Statistical Mechanics*.

798 Selected Topics in Physical Chemistry Spring. 3 credits.
Lec, T R S 9:05.
Topics vary.

Classics

Greek

101 Greek for Beginners Fall or spring. 3 credits.
Fall: M T W F 12:20, W. R. Johnson. Spring: M T W F 12:20, J. E. Coleman.
Introduction to Attic Greek. Designed to enable the student to read the ancient authors as soon as possible.

103 Attic Greek Fall or spring. 4 credits. Prerequisite: Classics 101 or equivalent.
Fall: M T W F 12:20, S. Stambler. Spring: M T W F 12:20, D. L. Malone.

[111–112 Modern Greek 111, fall; 112, spring. 3 credits each term. G. M. Messing. Not offered 1979–80.]

201 Attic Authors: Plato Fall. 3 credits. Prerequisite: Classics 103 or equivalent.
M W F 12:20. G. M. Kirkwood.
Plato's *Apology* and other selected readings.

203 Homer Spring. 3 credits. Prerequisite: Classics 103 or equivalent.
M W F 9:05. S. Stambler.
Readings in the Homeric epic.

204 Plato Spring. 3 credits. Prerequisite: Classics 103 or equivalent.
M W F 12:20. G. M. Kirkwood.
Selected readings from Plato.

209 Greek Composition Fall. 2 credits. Prerequisite: Classics 103 or equivalent.
W 2:30–4:30. P. Pucci.

210 Greek Composition Spring. 2 credits. Prerequisite: Classics 103 or equivalent.
T R 2:30–3:45. D. L. Malone.

[301 Greek Historians 4 credits. Prerequisite: Classics 203 or 204 or equivalent. Not offered 1979–80.]

302 Greek Tragedy Fall. 4 credits. Prerequisite: Classics 203 or equivalent.
M W F 11:15. G. M. Kirkwood.

[305 Attic Comedy 4 credits. Prerequisite: Classics 203 or 204 or equivalent. Not offered 1979–80.]

[306 Greek Melic, Elegiac, and Bucolic Poetry Fall. 4 credits. Prerequisite: Classics 203 or 204 or equivalent. Not offered 1979–80.]

[307 Plato 4 credits. Prerequisite: Classics 203 or 204 or equivalent. Not offered 1979–80.]

310 Greek Undergraduate Seminar: Narrative Technique in Ancient Historiography (also Classics 312) Spring. 4 credits. Prerequisite: two terms of 200-level course work in Greek or Latin or permission of instructors.
M W F 12:20. J. Ginsburg, S. Stambler.
A study of narrative methods in the Greek and Roman historians: Herodotus, Thucydides, Livy, and Tacitus will be the authors emphasized. Among the topics to be examined are the relation of ancient historiography to other genres (epic, tragedy, oratory); the use of such literary devices as characterization, speeches, digressions, omissions, chronological displacement, and anachronisms; narrative voice. Two meetings a week will be devoted to general discussion and one meeting will cover questions of syntax and translation.

401–402 Independent Study For qualified majors.

[417 Advanced Readings in Greek Literature Fall. 4 credits. Intended for advanced undergraduates and graduate students. Prerequisite: two terms of 300-level Greek or permission of instructor. Not offered 1979–80.]

418 Advanced Readings in Greek Literature: Hesiod Spring. 4 credits. Prerequisite: two terms of 300-level Greek or permission of instructor.
M W F 9:05. P. Pucci.

[419 Advanced Greek Composition Fall. 2 credits. Prerequisite: 209–219 or equivalent. Not offered 1979–80.]

[421 Advanced Readings in Greek Orators Spring. 4 credits. Prerequisite: two terms of 300-level Greek or permission of instructor. Not offered 1979–80.]

[442 Greek Philosophy 4 credits. Prerequisite: two terms of 300-level Greek or permission of instructor. Not offered 1979–80.]

671 Seminar Fall. 4 credits.
T 3–5. K. Clinton.

672 Seminar Spring. 4 credits.
T 3–5. G. M. Kirkwood.

701–702 Independent Study for Graduate Students

Latin

For information about placement in Latin courses, see the *Announcement of Academic Information*.

105 Latin for Beginners Fall. 4 credits.
M T W F 8, P. Kirkwood; M T W F 10:10; M T W F 1:25.
An introductory course in the essentials of the Latin language, designed for rapid progress towards reading the principal Latin writers.

106 Elementary Latin Spring. 4 credits. Prerequisite: Classics 105 or placement by departmental examination.
M T W F 8, P. Kirkwood; M T W F 10:10; M T W F 1:25.
A continuation of Classics 105, using readings from various authors.

107 Intensive Latin Spring. 7 credits.
M T W R F 1:25 plus an additional session to be arranged. F. M. Ahl.
The course work of Classics 105 and 106 is combined in one term.

108 Latin in Review Fall. 3 credits. Prerequisite: placement by departmental examination.
M W F 11:15. P. Kirkwood.

205 Intermediate Latin Fall. 3 credits. Prerequisite: Classics 106 or 108 or placement by departmental examination.
M W F 10:10, W. R. Johnson; M W F 1:25, K. Clinton.
Selected readings in Latin literature.

207 Catullus Spring. 3 credits. Prerequisite: Classics 106 or 108 or one term of 200-level Latin.
M W F 10:10. J. Ginsburg.
Readings from Catullus' poetry with emphasis on the traditions of love poetry, the poet's relation to his society, and other literary topics.

[208 Roman Drama Spring. 3 credits. Prerequisite: Classics 106 or 108 or one term of 200-level Latin. Not offered 1979–80.]

216 Vergil Spring. 3 credits. Prerequisite: one term of 200-level Latin.
M W F 11:15. F. M. Ahl.
Selections from Vergil's *Aeneid* will be read with emphasis on Vergil's use of the epic tradition, his own poetic milieu, his poetic techniques, and his relation to the politics of his time.

[241–242 Latin Composition 241, fall; 242, spring. 2 credits each term. Prerequisite: Classics 106 or 108 or equivalent. Not offered 1979–80.]

312 Latin Undergraduate Seminar: Narrative Technique in Ancient Historiography Spring. 4 credits.
M W F 12:20. J. Ginsburg, S. Stambler.
For description, see Classics 310.

[314 The Augustan Age Fall. 4 credits. Prerequisite: two terms of 200-level Latin. Not offered 1979–80.]

[315 Roman Satire Spring. 4 credits. Prerequisite: two terms of 200-level Latin. Not offered 1979–80.]

316 Roman Philosophical Writers Spring. 4 credits. Prerequisite: two terms of 200-level Latin.
T R 12:20–1:35. P. Pucci.

[317 Roman Historiography Spring. 4 credits. Prerequisite: one term of 300-level Latin. Not offered 1979–80.]

318 Roman Elegy: Tibullus, Propertius, Ovid Fall. 4 credits. Prerequisite: two terms of 200-level Latin.
T R 12:20. D. L. Malone.

319 Readings in Cicero (also History 319) Spring. 1 credit. Students also must be enrolled in Classics 270 (History 270).
Hours to be arranged. W. R. Johnson, A. Bernstein.
Students who are enrolled in History and Classics 270 and who know Latin may read selected texts in the original in an additional section each week.

[366 Late Latin Fall. 4 credits. Prerequisite: permission of instructor. Not offered 1979–80.
The *Rule* of St. Benedict.]

368 Medieval Latin Literature Fall. 4 credits. Prerequisite: Classics 214 or permission of instructor. Not offered 1979–80.
T R 2:30–3:45. W. Wetherbee.
Medieval Latin texts and their historical and cultural contexts are closely studied. Each term the course will concentrate on two or three topics, such as particular authors, genres, or periods.

411 Advanced Readings in Latin Literature: Latin Epistolography Fall. 4 credits. For advanced undergraduates and graduate students. Prerequisite: two terms of 300-level Latin or permission of instructor.
M W F 2:30. J. J. O'Donnell.
Varieties of Latin letter-writing, with representative examples from all periods; emphasis is on the contrasting styles of Cicero and Pliny the Younger.

[412 Advanced Readings in Latin Literature Spring. 4 credits. For advanced undergraduates and graduate students. Prerequisite: two terms of 300-level Latin or permission of instructor. Not offered 1979–80.]

441 Advanced Latin Composition Spring. 2 credits. Prerequisite: Classics 241–242 or graduate standing.
Hours to be arranged. G. M. Messing.

451–452 Independent Study Fall or spring. Credit to be arranged. For qualified majors.

[460 The Latin Poems of Milton 4 credits. W. R. Johnson. Not offered 1979–80.]

679 Seminar Fall. 4 credits.
R 3–5. F. M. Ahl.

680 Seminar Spring. 4 credits.
R 3–5. W. R. Johnson.

751–752 Independent Study for Graduate Students

Honors Courses

370 Honors Course Spring. 4 credits. To be taken in the junior year.
A program of readings and conferences centered on an author or topic chosen in accordance with the special interests of the student and instructor.

471 Honors Course Fall. 4 credits. To be taken in the senior year.
A continuation of Classics 370, with change of author or topic.

472 Honors Course: Senior Essay Spring. 4 credits. For students who have successfully completed Classics 471.
Topics must be approved by the honors adviser at the end of the first term of the senior year.

Classical Linguistics

[420 History of the Greek Language 3 credits. G. M. Messing. Not offered 1979–80.]

423 Vulgar Latin (see also Romance Linguistics) Spring. 4 credits.
M W F 9:05. G. M. Messing.
Selected texts such as the *Peregrinatio ad loca sancta* will be used to chart the changes in Latin that contributed to the development of the Romance languages.

[424 Italic Dialects 4 credits. G. M. Messing. Not offered 1979–80.]

[425 Greek Dialects Spring. 4 credits. G. M. Messing. Not offered 1979–80.]

Classical Archaeology

The following courses may be used toward satisfaction of the intercollege concentration in archaeology; see Archaeology, p. 51, and below, under Classical civilization, for other courses dealing with Classical art and architecture.

200 Mediterranean Archaeology (also Ancient Mediterranean Studies 200 and Near Eastern Studies 280) Fall. 3 credits. No prerequisites.
T R 12:20–1:35. J. E. Coleman, J. M. Weinstein, and guest lecturers.
An examination of the archaeological bases of ancient Mediterranean civilization, with special focus on contacts and interrelationships in the Bronze Age. Topics include: the rise of civilization in Egypt; the Bronze Age states of Syro-Palestine (Ebla, Ugarit, Byblos, etc.); the Hittites and Bronze Age Anatolia; Minoans, Mycenaeans, and their eastern and western contacts; the role of Cyprus; the invention and spread of writing; and ancient shipping and trade. Lectures by Coleman and Weinstein will be supplemented with talks by other scholars from Cornell and elsewhere.

206 Rise of Classical Greece Fall. 3 credits.
T R 2:30–4. P. I. Kuniholm.
Archaeology of the Greek dark ages. Topics include: site reports, pottery, metalworking, the introduction of the alphabet, the beginnings of coinage, and links with Anatolia and the Near East.

220 Introduction to Classical Archaeology (also History of Art 220) Fall. 3 credits.
M W F 10:10. A. Ramage.
The sculpture, vase painting, and architecture of the ancient Greeks, from the Geometric through the Hellenistic period. The art of the Romans, from the early Republic to the late Empire.

221 Minoan-Mycenaean Art and Archaeology (also History of Art 221) Spring. 3 credits.
T R 2:30–3:45. J. E. Coleman.
Greece from the Neolithic period to the end of the Bronze Age, with special emphasis on Minoan and Mycenaean civilizations.

222 The Individual and Society in Classical Athens
See description below, under "Classical Civilization."

232–233 Archaeology in Action I and II 232, fall; 233, spring. 3 credits each term. Prerequisite: Archaeology 100, Classics 220, or permission of the instructor.
Lec, M 2:30; 2 labs to be arranged. P. I. Kuniholm.
Objects from the Classical, Hellenistic, and Roman periods are "dug" out of Cornell basements, identified, cleaned, restored, catalogued, and photographed and are considered in their appropriate historic, artistic, and cultural contexts.

309 Dendrochronology of the Aegean Fall or spring. Variable credit. Prerequisite: permission of instructor. Enrollment limited to 10.
Lec, M 12:20; 2 labs to be arranged. P. I. Kuniholm.
Participation in a research project of dating modern and ancient tree ring samples from the Aegean and Mediterranean. Supervised reading and laboratory work. A possibility exists for summer fieldwork in Greece or Turkey.

[320 Arts and Monuments of Athens (also History of Art 320) Fall. 4 credits. Prerequisite: Classics 220 or permission of instructor. P. I. Kuniholm. Not offered 1979–80.]

321 Archaeology of Cyprus (also History of Art 321) Spring. 4 credits. Prerequisite: Classics 220 or permission of instructor.
M W F 10:10. J. E. Coleman.
Study of Cyprus from its first settlement in the Neolithic period until the end of the ancient world. Special emphasis on the Bronze Age, the acme of Cypriot culture, and the interconnection between Cyprus and the neighboring civilizations. Lectures and oral reports by students. Students will have the opportunity to examine and study original unpublished material from the Cornell excavation at Alambra and the study collection.

[322 Greeks and Their Eastern Neighbors Spring. 4 credits. Prerequisite: Classics 220 or 221 or permission of instructor. P. I. Kuniholm. Not offered 1979–80.]

[323 Painting in the Greek and Roman World (also History of Art 323) Not offered 1979–80.]

325 Greek Vase Painting (also History of Art 325) Fall. 4 credits.
W 2:30–4:30, plus one hour to be arranged.
A. Ramage.
A stylistic and iconographical approach to an art in which the Greeks excelled. The course will be arranged chronologically, from the early (eleventh century B.C.) anonymous beginnings to the "personal" hands of identifiable masters of the fifth and fourth centuries B.C. Styles other than Attic will be stressed.

[326 Art and Archaeology of Archaic Greece (also History of Art 326) Not offered 1979–80.]

327 Greek and Roman Coins (also History of Art 327) Spring. 4 credits.
M 2:30–4:30, plus one hour to be arranged.
A. Ramage.
A look at the varied issues of Greek cities and the Roman state. The coins will be considered as art objects as well as economic and historical documents. The changes in design, value, and metals from the origins of coinage to the Late Roman period are studied. Lectures, student presentations, work with actual examples.

329 Greek Sculpture (also History of Art 329) Fall. 4 credits.
T R 10:10–11:25. J. E. Coleman.
Study of ancient Greek sculptural techniques and achievements in marble and bronze. Detailed examination of a selection of works to illustrate sculptural development.

330 Art in Pompeii: Origins and Echoes (also History of Art 330) Spring. 4 credits.
M W F 10:10. A. Ramage.
Greek and Roman art in the context of the daily life of a provincial Italo-Greek town. The interrelation of art and household objects in classical culture will be stressed and earlier traditions will be described. Subsequent development of Roman minor arts will be covered, as well as the discovery of Pompeii and its effect on European taste.

[350 Arts of the Roman Empire (also History of Art 322) Not offered 1979–80.]

[629 Seminar in Aegean Archaeology Spring. 4 credits. J. E. Colman. Not offered 1979–80.]

[630 Seminar in Classical Greek Archaeology 4 credits. Not offered 1979–80.]

Classical Civilization

Knowledge of Greek or Latin is not needed for these courses.

100 Word Power: Greek and Latin Elements in the English Language Fall. 3 credits.
T R 10:10–11:25. G. M. Messing.
This course gives the student with no knowledge of Classical languages an understanding of how the Greek and Latin elements, which make up over half our English vocabulary, operate in both literary and scientific English usage. Attention is paid to how words acquire their meaning and to enlarging each student's working knowledge of vocabulary and grammar.

119.1 Freshman Seminar in Greek Literature Fall and spring. 3 credits.
Fall: M W F 11:15, S. Stambler. Spring: M W F 9:05, D. Ranneft.
Topic for fall 1979: Travellers' tales. The course will study the way the Greeks interpreted their experiences of distant places, both real and imaginary. It will cover factual reports of the exotic as well as the folktales and fantasies that the Greeks created about people and places beyond their knowledge. Further uses of travellers' tales, particularly in utopian literature and satirical comment, will also be examined, using not only ancient texts but also modern imitations. Readings will include Homer's *Odyssey*, Herodotus' *Histories*, Aristophanes' *Birds*, Aeschylus' *Prometheus Bound*, Euripides' *Helen*, Plato's *Republic* and his version of the Atlantis legend, Lucian's *True History*, Swift's *Gulliver's Travels*, Fielding's *A Journey from this World to the Next*, More's *Utopia*, and Carroll's *Through the Looking Glass*. Spring topic to be announced.

119.2 Freshman Seminar in Greek Literature Fall and spring. 3 credits.
Fall: M W F 9:05, L. Collins. Spring: M W F 11:15. Topic to be announced.

119.3 Freshman Seminar in Greek Literature: Herodotus Fall. 3 credits.
T R 12:20–1:35. L. S. Abel.
Herodotus of Halicarnussus travelled in the eastern Mediterranean during the fifth century B.C. and asked questions about the people, the institutions, and the monuments he encountered. In this seminar we will read the results of Herodotus' investigations so that, as he had hoped, we can remember the great accomplishments of human beings and understand why the Greeks and Persians made war on one another.

119.4 Freshman Seminar in Greek Literature: Socrates and Plato Spring. 3 credits.
T R 12:20–1:35. J. J. O'Donnell.
The masterpieces of Plato's literary and philosophical achievement (*Apology, Crito, Phaedo, Republic*) are read and discussed as living models of rational discourse and as windows into the intellectual life of ancient Athens.

120 Freshman Seminar in Latin Literature: Narration and Persuasion Fall. 3 credits.
M W F 12:20. D. L. Malone.
Roman treatises on rhetoric discuss two different kinds of communication, simple relation or events or facts and argumentation with the intent to persuade. These concepts of narration and persuasion provide a starting point for the interpretation of the authors selected for reading. Texts which are primarily narrative are drawn from history, epic, and the novel. Philosophy and satire provide examples of persuasive literature. In addition, the rhetorical concepts lay the groundwork for class discussion about communication in general.

121 Freshman Seminar in Archaeology Fall or spring. 3 credits.
T R 10:10–11:25.

200 Mediterranean Archaeology See description above under "Classical Archaeology."

206 Rise of Classical Greece See description above under "Classical Archaeology."

211 The Greek Experience Fall. 3 credits.
M W F 11:15. F. M. Ahl.
An introduction to the literature and thought of ancient Greece with emphasis on their oral and dramatic presentation and intellectual and visual contexts. There will be analysis of tragedy and comedy, satire, and epic and lyric poetry; also selected prose works, augmented by films, slides, playreadings, and individual student interpretations.

212 The Roman Experience Spring. 3 credits.
M W F 9:05. J. Ginsburg.
An introduction to the civilization of the Romans as expressed in their literature, art, and social and political institutions. This course will examine not only the intellectual life of the Romans, but what it meant for men and women of all social classes to live in the Roman world. Selected readings in translation of works of literature, history, and philosophy, supplemented by slides and other visual materials.

220 Introduction to Classical Archaeology (also History of Art 220) See description above under "Classical Archaeology."

221 Minoan-Mycenaean Art and Archaeology (also History of Art 221) See description above under "Classical Archaeology."

222 The Individual and Society in Classical Athens Spring. 3 credits. Prerequisite: Classics 211 or 220 or History 161 or 265 or 266 or permission of instructor.
M W F 1:25. K. Clinton.
From Classical Athens (fifth and fourth centuries B.C.) come many of the most outstanding achievements in Western civilization: in literature, art, philosophy, historical writing, and the sciences. This course will survey Athenian daily life and discuss Athenian society with a view to isolating aspects which facilitated the development of the individual and individual achievement. Topics will include: family life, education, economics, government, material culture, religion, social structure. Political and military history, while not totally disregarded, will not be of primary concern.

[224 Greek Philosophy Fall. 3 credits. Not offered 1979–80.]

[225 Hellenistic and Roman Philosophy Spring. 3 credits. Not offered 1979–80.]

226 The Genius of Christianity Fall. 3 credits.
M W F 1:25. J. J. O'Donnell.
An evocation of the spirit of the Christian religion over the course of its history. Lectures will survey varieties of Christian experience from New Testament origins to contemporary controversies, while readings will be chosen from the classics of Christian literature. Authors read will include theologians, apologists, poets, and mystics from all periods.

232–233 Archaeology in Action I and II See description above under "Classical Archaeology."

236 Greek Mythology (also Comparative Literature 236) Fall. 3 credits.
M W F 10:10. P. Pucci.
A survey of the Greek myths, with emphasis on myths that have entered the postclassical Western tradition. Of the aspects of mythology to be studied the following will be among the most important: what "myth" meant to the Greeks; the factors and influences involved in the creation of myths; and the significance of myths in daily life, religion, and thought. Comparison and contrast with Roman attitudes to myth.

[237 Greek and Roman Mystery Religions 3 credits. Not offered 1979–80.]

[238 The Ancient Epic: Homer and Vergil Spring. 3 credits. Not offered 1979–80.]

270 Cicero and His Age (also History 270) Spring. 4 credits.
Lec, W F 2:30; discussion to be arranged.
W. R. Johnson, A. Bernstein.
An interdisciplinary examination of the final decades of the Roman Republic as seen through the eyes of the period's most prolific writer. Selections from Cicero's speeches, his personal correspondence, and his philosophical, political, and oratorical essays are studied for the light they throw on both the man and his times. (Students who are enrolled in History/Classics 270 and know Latin may read selected texts in the original in an additional section each week. See Classics 319, above.)

300 Greek and Roman Drama (also Comparative Literature 300) Spring. 4 credits.
T R 10:10–11:25. G. M. Kirkwood.
A study of ancient tragedy and comedy as exemplified by representative plays, read in translation, of Aeschylus, Sophocles, Euripides, Aristophanes, Menander, Plautus, Terence, and Seneca. Main emphasis is on Greek tragedy. Consideration also of the development of the Greek theater (illustrated) and its relationship to the form and presentation of the dramas, the origins of tragedy and the influence of Greek tragedy and Seneca on later European drama.

[304 Roman Law 4 credits. Not offered 1979–80.]

309 Dendrochronology of the Aegean See description above under "Classical Archaeology."

[320 Arts and Monuments of Athens (also History of Art 320) See description above under "Classical Archaeology." Not offered 1979–80.]

[321 Archaeology of Cyprus (also History of Art 321) See description above under "Classical Archaeology." Not offered 1979–80.]

[322 Greeks and their Eastern Neighbors See description above under "Classical Archaeology." Not offered 1979–80.]

[323 Painting in the Greek and Roman World (also History of Art 323) See description above under "Classical Archaeology." Not offered 1979–80.]

325 Greek Vase Painting (also History of Art 325) See description above under "Classical Archaeology."

[326 Art and Archaeology of Archaic Greece (also History of Art 326) See description above under "Classical Archaeology." Not offered 1979–80.]

327 Greek and Roman Coins (also History of Art 327) See description above under "Classical Archaeology."

329 Greek Sculpture (also History of Art 329) See description above under "Classical Archaeology."

330 Art in Pompeii: Origins and Echoes (also History of Art 330) See description above under "Classical Archaeology."

[331 Greek Foundations of Western Literature (also Comparative Literature 331) 4 credits. Not offered 1979–80.]

[333 Latin Foundations of Western Literature (also Comparative Literature 333) 4 credits. Not offered 1979–80.]

[336 Foundations of Western Thought: Plato and His Influence Spring. 4 credits. Not offered 1979–80.]

[337 Ancient Philosophy of Science Fall. 4 credits. Not offered 1979–80.]

[339 Ancient Wit: An Introduction to the Theory and Form of Comic and Satiric Writing in Greece and Rome (also Comparative Literature 339) Spring. 4 credits. Not offered 1979–80.]

[345 Greek and Roman Historians Fall. 4 credits. Not offered 1979–80.]

363 Women in Classical Greece and Rome (also Women's Studies 363) Spring. 4 credits.
T R 12:20–1:25. L. Abel.
The evidence about the social and political position of women in ancient Greece and Rome is examined. The purpose is to trace the origins of some Western attitudes about women and to address general historical questions about the nature of evidence, basic chronology, and the development of political systems.

[365 Cicero and His Age (also History 365) 4 credits. Not offered 1979–80.]

426 Augustine Spring. 4 credits. Prerequisites: Classics 428 or permission of instructor.
M W F 2:30–4:30. J. J. O'Donnell.
The life and works of the dominant native genius of western medieval intellectual history. Readings are taken mainly from the works of Augustine in English translation.

[428 The Church of the Fathers Spring. 4 credits. J. J. O'Donnell. Not offered 1979–80.]

[430 Genre and Period in Greek and Roman Literature (also Comparative Literature 430) 4 credits. Prerequisites: one upper-division course in Classics, comparative literature, English, or the modern foreign languages and senior standing or permission of the instructor. Not offered 1979–80.]

[610 Language of Myth (also Anthropology 610) 4 credits. Not offered 1979–80.]

[629 Seminar in Classical Archaeology See description above under "Classical Archaeology." Not offered 1979–80.]

[630 Seminar in Classical Greek Archaeology See description above under "Classsical Archaeology." Not offered 1979–80.]

711–712 Independent Study for Graduate Students

Related Courses in Other Departments

Architecture of the Classical World (Architecture 341)

Seminar in Architecture of the Classical World (Architecture 641)

The Ancient City: Plato and Machiavelli (History 261)

[The Emergence of Greek Democracy (History 265) Not offered 1979–80.]

The Roman Republic (History 267)

Rome of the Caesars (History 268)

[Archaic Greece, 776–500 B.C. (History 450) Not offered 1979–80.]

Greece from Cleisthenes to Cleon, 514–429 B.C. (History 452)

Thucydides and the Peloponnesian War, 432–404 B.C. (History 453)

[Greece in the Age of Lysander and Agesilaus, 410–360 B.C. (History 454) Not offered 1979–80.]

[Philip of Macedon and Alexander the Great (History 455) Not offered 1979–80.]

Roman Imperialism (History 460)

The Roman Revolution (History 461)

[The High Roman Empire (History 462) Not offered 1979–80.]

[Decline and Fall of the Roman Empire (History 463) Not offered 1979–80.]

[Science in Classical Antiquity (History 481–482) Not offered 1979–80.]

[Social and Economic History of Ancient Rome (History 561) Not offered 1979–80.]

[Roman Africa (History 562) Not offered 1979–80.]

[Graduate Seminar in Ancient Classical History (History 661) Not offered 1979–80.]

[Numismatics (History of Art 424) Not offered 1979–80.]

[Ancient Thought (Philosophy 210) Not offered 1979–80.]

[Ancient Philosophy (Philosophy 211) Not offered 1979–80.]

[Plato (Philosophy 309) Not offered 1979–80.]

Aristotle (Philosophy 310)

[Topics in Ancient Philosophy (Philosophy 314) Not offered 1979–80.]

Plato and Aristotle (Philosophy 413)

Ancient Philosophy (Philosophy 611)

The History of Ancient Israel (Near Eastern Studies 243)

The Jews of the Ancient and Muslim Near East: 450 B.C.E.–1204 C.E. (Near Eastern Studies 244)

The Jews of the Christian West: 476–1948 (Near Eastern Studies 245)

Ancient Seafaring (Near Eastern Studies 249)

[Introduction to Biblical Archaeology (Near Eastern Studies 285) Not offered 1979–80.]

[Interconnections in the Eastern Mediterranean World in Antiquity (Near Eastern Studies 385) Not offered 1979–80.]

Archaeology of the Ancient Near East (Near Eastern Studies 387 and Archaeology 310)

Archaeology of Ancient Egypt (Near Eastern Studies 388)

[Seminar in Syro-Palestinian Archaeology (Near Eastern Studies 481) Not offered 1979–80.]

Comparative Literature

Freshman Seminars are listed in the Freshman Seminar brochure.

110 Psychoanalysis: Introduction to Psychoanalytic Theory Spring. 4 credits. No prerequisites.
Lec, F 1:25–3:35; discussion, M 1:25–2:15.
S. L. Gilman and guest lecturers from Cornell Medical College.
A survey of the major concepts of psychoanalytical theory. The course will consist of a close reading of major texts in the history of psychoanalysis (especially those of Sigmund Freud). Lecturers will deal with topics such as dream interpretation, transference, anxiety, narcissism. Discussion groups will analyze literary works in the light of psychoanalytic theory.

201–202 Great Books 201, fall; 202, spring. 4 credits. Comparative Literature 201 is not a prerequisite to 202.
Fall, M W F 10:10, W. J. Kennedy. Spring, T R 2:30–3:45, T. Bahti.
A reading each semester of seminal texts that represent and have often shaped Western culture, and ought to be part of every college student's education. By analyzing, interpreting, and evaluating them, the course will develop essential critical reading abilities. First semester: selections from the Bible, Homer, Plato, Virgil, Dante, Machiavelli, Shakespeare, and Molière. Second semester: selections from Rousseau, Goethe, Wordsworth, Flaubert, Baudelaire, Rilke, Brecht, and others.

236 Greek Mythology (also Classics 236) Fall. 3 credits.
M W F 10:10. P. Pucci.
A survey of the Greek myths, with emphasis on myths that have entered the post-classical Western tradition. Of the aspects of mythology to be studied the following will be among the most important: what "myth" meant to the Greeks; the factors and influences involved in the creation of myths; and the significance of myths in daily life, religion, and thought. Comparison and contrast with Roman attitudes to myth.

238 The Ancient Epic: Homer and Vergil (also Classics 238) Spring. 3 credits.
M W F 12:20. W. R. Johnson.
A full discussion of the most outstanding epics of the ancient world. Homer's *Iliad* and *Odyssey* and Vergil's *Aeneid*, with some attention to other ancient epics. Interpretation of the three epics as works of art and the development of the epic genre in antiquity will be of primary concern.

300 Greek and Roman Drama (also Classics 300) Spring. 4 credits.
T R 10:10–11:25. G. M. Kirkwood.
A study of ancient tragedy and comedy as exemplified by representative plays, read in translation, of Aeschylus, Sophocles, Euripides, Aristophanes, Menander, Plautus, Terence, and Seneca. Main emphasis is on Greek tragedy. Consideration also of the development of the Greek theater (illustrated) and its relationship to the form and presentation of the dramas; the origins of tragedy; the influence of Greek tragedy and Seneca on later European drama.

309 Mystery and the Nature of Fiction (also French 309) Fall. 4 credits.
M W F 11:15. D. I. Grossvogel.
Our sense of mystery: how it affects, and is reflected in, our fiction. Main readings: Sophocles, Dostoevsky, Camus, Borges, Kafka, Poe, Robbe-Grillet, Agatha Christie.

311 European Epic Spring. 4 credits.
T R 12:20. C. Kaske.
Homer, *Iliad;* Vergil, *Aeneid; Beowulf; The Song of Roland;* Dante's *Divine Comedy, Inferno,* and selections from the rest; Milton, *Paradise Lost;* and one other work to be selected by the class, possibly *Moby Dick*. Informal lecture and discussion. Two short papers and one longer paper.

312 Comedy Fall and spring. 4 credits.
M W F 12:20. W. J. Kennedy.
Discussion of comic styles (classical, colloquial, improvisational, absurd) and modes of comedy (satire, romance, farce, grotesque) in drama and narrative fiction from Aristophanes to Nabokov, with special attention to Chaucer, Rabelais, Molière, Shaw, and Ionesco.

326 Christian Origins Spring. 4 credits. Not open to freshmen.
M W F 11:15. C. M. Carmichael.
The customs and conventions, the religious and moral ideas found in the New Testament will be traced in the Old Testament and in other Jewish writings (especially in the *Passover Haggadah*).

328 Literature of the Old Testament Fall. 4 credits. Not open to freshmen.
M W F 11:15. C. M. Carmichael.
A study of the customs and conventions, and of the religious, moral, legal and wisdom ideas found in the Old Testament.

343 Medieval Literature Fall. 4 credits.
M W F 12:20. R. E. Kaske.
Analysis and interpretation of great medieval literary works in translation. Though readings will vary somewhat from year to year, a typical program would be *Beowulf; Nibelungenlied; Njássaga;* a romance of Chretien; Wolfram's *Parzival;* Gottfried's *Tristan;* and/or *Sir Gawain and the Green Knight.*

344 Medieval Literature (also Italian 334) Spring. 4 credits.
M W F 12:30. G. Mazzotta.
Dante in translation.

353 European Drama 1660–1900 (also Theatre Arts 326) Fall. 4 credits.
T R 10:10–11:25. I. Hauptman.
Readings from major dramatists from Molière to Ibsen, including such authors as Racine, Congreve, Sheridan, Schiller, Goethe, Hugo, Büchner, Gogol, Turgenev, Zola, Hauptmann, and Chekhov.

354 Modern Drama (also Theatre Arts 327) Spring. 4 credits.
M W F 1:25.
Readings from major dramatists of the twentieth century, including Ibsen, Chekhov, Strindberg, Shaw, Pirandello, Ionesco, Brecht, Pinter, and others.

357 The Literature of Europe since the Renaissance Spring. 4 credits.
M W F 9:05. T. L. Jeffers.
A study of European masterpieces, with particular focus on the moral and ontological issues they raise. Much emphasis on developing students' abilities to speak to each other in discussion and in essays. Probable reading list: Stendahl, *The Red and the Black;* Dostoevsky, *Crime and Punishment;* Tolstoy, *Anna Karenina;* James, *The Portrait of a Lady;* Nietzsche, *The Birth of Tragedy* and *Genealogy of Morals;* Mann, *The Magic Mountain.*

361 Introduction to Renaissance Culture (also History 361) Fall. 4 credits. No prerequisites.
T R 1:25, plus one hour to be arranged. E. Morris, J. Najemy, with C. Gilbert, G. Mazzotta, D. Randel.
A general introduction, organized around six major figures (Petrarch, Machiavelli, Leonardo da Vinci, Josquin des Pres, Erasmus, Rabelais) with lectures by members of several departments. Close reading of texts, and consideration of musical and visual examples, will allow students to deal directly with problems of interpretation. Fundamental assumptions about "culture" and historiography will be examined. Two lectures and one discussion section each week.

363–364 The European Novel Fall and spring. 4 credits. Comparative Literature 363 is not a prerequisite to 364.
T R 12:20–1:35. Fall: W. W. Holdheim and E. Rosenberg; spring, E. Rosenberg and K. Gottschalk.
Close reading of approximately eight works each term. Comparative Literature 363: From Cervantes to Dostoevsky. Comparative Literature 364: From Flaubert to Nabokov. Authors to be read will include Sterne, Voltaire, Balzac, Tolstoy, Mann, and Proust. The works discussed will illustrate novelistic subgenres such as the picaresque novel, the novel of manners, the philosophical tale, the historical novel, the detective story, and the bildungsroman.

388 Ideas and Literary Art in Great Political Novels Fall. 4 credits.
T R 10:10, plus one hour to be arranged. G. Gibian.
Discussion of themes and structural forms in novels in which social and philosophical problems play a prominent part. Malraux, *Man's Fate;* Dostoevsky, *The Possessed;* Turgenev, *Fathers and Sons;* Naipaul, *The Guerillas;* and others. Literary treatments of revolutionary movements, individual development, art, and social unity.

[389 Modern Literature in Poland, Czechoslovakia, Hungary, and Yugoslavia Not offered 1979–80; next offered 1980–81.]

391 Readings in Modern Poetry Fall. 4 credits.
T R 2:30–3:45. T. Bahti.
An intensive introduction to five major modern poets: Baudelaire, Mallarmé, Yeats, Rilke, and Stevens. Questions will include the relations of self and language; the poet, history, and myth; "Romanticism" and "modernity;" and the intrinsic difficulty and interest of poetry. Bilingual texts will be used.

395 Introduction to Twentieth-Century Criticism Fall. 4 credits.
T R 12:20–1:35. T. Bahti.
Major modern critics and critical movements, representing historical, philosophic, ideological, and various formal approaches to literature will be considered both historically and critically. Texts will be drawn from Lukacs, the Russian formalists, Benjamin, Heidegger, Sartre, Auerbach, Frye, structuralism and post-structuralism, and others. Readings available in English.

399 Women Writers and Self-consciousness Spring. 4 credits.
T R 12:20–1:35. I. Ezergailis.
A thematic and structural investigation of women's writing (mostly prose) to explore the tension between the highly developed self-awareness of the narrator and/or heroine and the traditional expectation of naive wholeness from the female. We will document the problem and trace some of the ways in which women writers have tried to resolve or transcend it by retreat, acceptance, or new synthesis. The list of authors includes Jane Austen, Willa Cather, Edith Wharton, Colette, Virginia Woolf, Doris Lessing, and Sylvia Plath.

415 Fairy Tale and Narrative (also Russian Literature 415) Fall. 4 credits.
T R 2:30–3:45. P. Carden.
Using Propp's classic work *Morphology of the Folktale* as a point of departure, we will look at examples of fairy tales and other traditional narratives, examples of nineteenth-century fictional narrative (short story, novel), and avant-garde narrative forms. We will discuss these narratives in the light of Propp's work and the critique of his work made by Meletinsky, Lévi-Strauss, Bremond, Greimas, and others.

419–420 Independent Study Fall and spring. Variable credit. Comparative Literature 419 is not a prerequisite to 420.
Staff.

421 Old Testament Seminar Fall. 4 credits. Limited to 20 students.
R 2:30–4:30. C. M. Carmichael.
Identification and discussion of problems in the Old Testament.

426 New Testament Seminar Spring. 4 credits. Limited to 20 students.
R 2:30–4:30. C. M. Carmichael.
Identification and discussion of problems in the New Testament.

429 Readings in the New Testament Fall. 4 credits. No prerequisites.
M W F 1:25. J. P. Bishop.
Close readings of representative texts from the New Testament in modern scholarly editions, with the help of appropriate commentary, introductory and specialized. The focus in 1979 will be on Acts and the letters of Paul. All readings will be in English, but some reference to the Greek original will be made. Graduate students and undergraduates from other colleges should not feel inhibited from enrolling. The approach will be chiefly academic and literary but with the hope of staying open to scholarly and religious isses alike.

456 The Utopian Mind Spring. 4 credits.
R 1:25–3:25. P. Hohendahl.
The seminar explores the changing meaning of utopian thought from the sixteenth to the twentieth century. Working with basic concepts from the writings of Bloch, Mannheim, and Marcuse the course will cover major utopian texts, including More, Fourier, Marx, Bellamy, Hesse, and Huxley. Discussion will be organized around essential philosophical, literary, and social aspects of utopian thinking like the notions of human perfection and happiness, the idea of scientific transformation and educational stabilization of societies as well as the problem of the aesthetic presentation of the unreal. All texts will be read in English.

465 Feminist Literary Criticism (also Women's Studies 465) Spring. 4 credits. Prerequisite: permission of instructor.
T R 2:30–3:45. R. Levin.
An examination of recent feminist literary criticism and theory. The course will explore such categories as (1) "images of women" as they are *produced* in works by male writers, (2) criticism of female authors, (3) development of a feminist poetics: modes and methodologies. Discussion will focus on both primary and secondary texts with an eye toward students' own research interests. Reading will include works by Charlotte Brontë, Virginia Woolf, Kate Millett, Mary Ellmann, Elaine Showalter, and Tillie Olsen, among others.

471 Romanticism: Dialectic and Rhetoric Spring. 4 credits.
W 2:30–4:30. T. Bahti.
Readings in poetry and discursive prose (primarily aesthetics) of the late eighteenth and early nineteenth centuries. The seminar will focus on the question of dialectical and/or rhetorical modes of narrative, argument, and understanding. Texts will be drawn from Kant, Schiller, Wordsworth, Hölderlin, Schlegel, Hegel, Leopardi, and Keats. Readings available in English.

495 Aesthetic Theory of the Frankfurt School Fall. 4 credits.
R 2:30–4:30. P. Hohendahl.
The course is designed as an introduction to the history of the Frankfurt School and the essential concepts of critical theory. The emphasis will be placed on the theory of culture and its application to the understanding of literature and aesthetics. The reading material will be taken from the works of Max Horkenheimer, Theodor W. Adorno, Walter Benjamin, Herbert Marcuse, and Jürgen Habermas.

596 Memory, Creation, and the Novel (also Romance Studies 596) Spring. 4 credits.
M 1:25–3:25. D. I. Grossvogel.
Reading Proust through Bergson. With special attention to the problems of time, memory, psychology, language, and aesthetics as reflected in the works of the novelist and philosopher.

619–620 Independent Study Fall and spring. Variable credit. Comparative Literature 619 is not a prerequisite to 620.
Staff.

690 Ortega y Gasset's *The Dehumanization of Art and Ideas on the Novel* (1925) (also Romance Studies 699) Spring. 4 credits. Conducted in Spanish.
T 2:25–4:25. C. Arroyo.
Analysis of the text and incorporation into the European aesthetics of its time from Marinette to Malraux's *Voice of Silence*.

698 Literature and History Fall. 4 credits. Prerequisite for undergraduates: permission of instructor.
M 2:30–4:30. W. W. Holdheim.
Close reading of selected texts illustrating the following trends and concerns in the modern history of ideas: the triumph of philology (Spitzer, Auerbach); formalism and its sequel (Tynjanov, Mukarovsky, Barthes); the problem of language and aesthetics (Kracauer, Lévi-Strauss, Hayden White, Gadamer, Jolles). The analysis will always revolve around the interrelationship of historiography and literature, and also deal with the question of the aesthetic nature of historical knowledge itself. The course is open to qualified undergraduates after consultation with the instructor.

699 Hermeneutics Spring. 4 credits. Prerequisite for undergraduates: permission of instructor.
M 2:30–4:30. W. W. Holdheim.
An intensive study of H. G. Gadamer's work *Truth and Method* (in translation) will lead to an examination of such problems as: the structure of humanistic and historical knowledge and its relation to theoretical knowledge; "objectivity" and "subjectivity" in interpretation; the role of language in human existence; the nature of the aesthetic phenomenon. Various modern intellectual trends will be located and evaluated in terms of an overall theory of understanding. The course is open to qualified undergraduates after consultation with the instructor.

Related Courses in Other Departments

Many of these courses are conducted in English, and readings are in translation.

Chekhov (Russian 373)

Russian Novel in Translation (Russian 367)

The Shtetl in Modern Yiddish Fiction in English Translation (German 375)

Yiddish Literature in English Translation (German 350)

The Modern German Novel in English Translation (German 413)

Old Icelandic Literature in English Translation (German 424)

Modern German Drama (German 311)

[Chinese Philosophical Literature (Asian Studies 371) Not offered 1979–80.]

[Chinese Poetry (Asian Studies 372) Not offered 1979–80.]

Twentieth-Century Chinese Literature (Asian Studies 373)

Chinese Narrative Literature (Asian Studies 374)

Japanese Narrative Literature (Asian Studies 377)

[Japanese Poetry and Drama (Asian Studies 375) Not offered 1979–80.]

Modern Japanese Fiction (Asian Studies 376)

[Japanese No Theatre (Asian Studies 400) Not offered 1979–80.]

[Southeast Asian Literature in Translation (Asian Studies 379) Not offered 1979–80.]

[The Literature of Ancient Israel I (Near Eastern Studies 221) Not offered 1979–80.]

The Literature of Ancient Israel II (Near Eastern Studies 222)

Freshman Seminar in Biblical Literature: Heroes and Heroines of the Bible (Near Eastern Studies 225)

Classics of Islamic Literature (Near Eastern Studies 250)

Classical Islam (Near Eastern Studies 253)

Modern Hebrew Literature in English Translation (Near Eastern Studies 260–261)

[Ancient Near Eastern Literature (Near Eastern Studies 282 and Comparative Literature 326) Not offered 1979–80.]

[The Historical Development of Rabbinic Legal Literature (Near Eastern Studies 333) Not offered 1979–80.]

Biblical Interpretation in Rabbinic Literature (Near Eastern Studies 334)

Jewish Contributions to Western Culture (Jewish Studies 101)

Computer Science

For complete course descriptions, see the computer science listings in the "College of Engineering" section.

100 Introduction to Computer Programming Fall or spring. 3 credits. S-U grades optional. 2 lec, 1 recitation (optional), 4 evening tests. Students who contemplate taking both Computer Science 101 and 100 must take 101 first.

101 The Computer Age Spring. 3 credits. S-U grades optional. 2 lec, 1 recitation. Credit will not be granted for both Computer Science 100 and 101 unless 101 is taken first.

102 Introduction to FORTRAN Programming Fall or spring (weeks 1 through 5 only). 1 credit. S-U grades optional. Credit will not be granted for both Computer Science 100 and 102 unless 102 is taken first.

103 Introduction to PASCAL Fall or spring (weeks 6 through 9 only). 1 credit. S-U grades optional. Prerequisite: Computer Science 100 or equivalent programming experience.

104 Introduction to APL Programming Fall or spring (weeks 2 through 5 only). 1 credit. S-U grades optional. Prerequisite: Computer Science 100 or equivalent programming experience.

107 Introduction to Interactive Computing with CMS Fall or spring (weeks 2 through 5 only). 1 credit. S-U grades only. Prerequisite: Computer Science 100 or equivalent programming experience.

108 Introduction to Statistical Packages Fall or spring (weeks 10 through 13 only). 1 credit. S-U grades only.

109 Multistep Job Processing and JCL Fall or spring (weeks 6 through 9 only). 1 credit. S-U grades only. Prerequisite: Computer Science 100 or equivalent programming experience.

211 Computers and Programming Fall or spring. 3 credits. 2 lec, 1 lab, 2 evening quizzes (fall: Oct. 9, Nov. 15; spring: Feb. 26, April 10). Prerequisite: Computer Science 100 or equivalent programming experience.

280 Discrete Structures Fall. 4 credits. 3 lec. Prerequisite: Computer Science 211 or permission of instructor.

305 Computers and Society Fall. 3 credits. 2 lec-seminars. Prerequisite: Computer Science 100 or 101 or permission of instructor.

314 Introduction to Computer Systems and Organization Fall or spring. 4 credits. 2 lec, 1 lab. Prerequisite: Computer Science 211 or equivalent.

321–322 Introduction to Numerical Analysis 321, fall; 322, spring. 4 credits each term. 3 lec. Prerequisites: Computer Science 321 and Mathematics 293 or 221; Computer Science 322 and Mathematics 294 or 222; and knowledge of a programming language such as FORTRAN or PL/1.

410 Data Structures Fall. 4 credits. 3 lec. Prerequisite or corequisite: Computer Science 314.

414 Systems Programming and Operating Systems Spring. 4 credits. 3 lec. Prerequisite: Computer Science 314 or permission of instructor.

417 Computer Graphics (also Architecture 334) Fall. 3 credits. Prerequisites: two terms of calculus and Computer Science 211 or equivalents.

432 Introduction to Simulation and Database Systems (also Engineering OR&IE 383) Spring. 4 credits. 2 lec, 1 rec. Prerequisite: Computer Science 211.

434 Introduction to Database Systems Spring (weeks 7 through 14 only). 2 credits. 2 lec, 1 rec. Prerequisite: Computer Science 211 or equivalent.

481–482 Introduction to Theory of Computing I and II 481, fall; 482, spring. 4 credits each term. 3 lec. Prerequisites: Computer Science 211 and 280, or equivalent course work in mathematics, or permission of instructor.

490 Independent Reading and Research Fall or spring. 1–4 credits.

600 Computer Science and Programming Fall. 1 credit. Prerequisite: graduate standing in computer science or permission of instructor.

611 Advanced Programming Languages Fall. 4 credits. 3 lec. Prerequisite: Computer Science 410 or equivalent.

612 Translator Writing Spring. 4 credits. 3 lec. Prerequisites: Computer Science 410 and 481 or permission of instructor.

613 Operating System Principles Fall. 4 credits. 3 lec. Prerequisite: Computer Science 410 and 414 or permission of instructor.

[615 Machine Organization Spring. 4 credits. 3 lec. Prerequisite: Computer Science 314 or permission of instructor. Not offered 1979–80.]

[618 Picture Processing Spring. 4 credits. 3 lec. Prerequisite: Computer Science 611 or permission of instructor. Not offered 1979–80.]

621–622 Numerical Analysis 621, fall; 622, spring. 4 credits each term. 3 lec. Prerequisites: Mathematics 411 and knowledge of a programming language such as FORTRAN or PL/1.

632 Analysis of Database Systems Fall. 4 credits. 2 lec. Prerequisites: Computer Science 410 and either 432 or permission of instructor.

635 Information Organization and Retrieval Spring. 4 credits. 2 lec. Prerequisite: Computer Science 410 or equivalent.

681 Theory of Algorithms and Computing I Fall. 4 credits. 3 lec. Prerequisite: Computer Science 482 or permission of instructor.

682 Theory of Algorithms and Computing II Spring. 4 credits. 3 lec. Prerequisite: Computer Science 481 or permission of instructor.

709 Computer Science Graduate Seminar Fall or spring. 1 credit each semester. 1 seminar. Intended for graduate students interested in computer science.

[711 Theory of Programming Languages Spring. 4 credits. 2 lec. Prerequisites: Computer Science 611 and 481. Offered alternate years. Not offered 1979–80.]

712 Theoretical Aspects of Compiler Construction Spring. 4 credits. 2 lec. Prerequisites: Computer Science 612 and 481. Offered alternate years.

713 Seminar in Operating Systems Fall or spring. 4 credits. 1 seminar. Prerequisite: Computer Science 613 or permission of instructor.

719 Seminar in Programming Fall or spring. 4 credits. 1 seminar. Prerequisite: Computer Science 611 or permission of instructor.

[721 Solutions of Nonlinear Equations and Nonlinear Optimization Problems Fall. 4 credits. Prerequisite: Computer Science 622 or permission of instructor. Not offered 1979–80.]

[723 Numerical Solution of Ordinary Differential Equations and Integral Equations Fall. 4 credits. Prerequisite: Computer Science 622 or permission of instructor. Not offered 1979–80.]

[725 Numerical Solution of Partial Differential Equations Spring. 4 credits. Hours to be arranged. Prerequisite: Computer Science 622 or permission of instructor. Not offered 1979–80.]

727 Matrix Computations Fall. 4 credits. Prerequisite: Computer Science 621 or permission of instructor.

729 Seminar in Numerical Analysis Fall or spring. 4 credits. Prerequisite: permission of instructor.

[733 Selected Topics in Information Processing (also Engineering OR&IE 789) Not offered 1979–80.]

734 Seminar in File Processing Fall. Credit and hours to be arranged. Prerequisite: Computer Science 733.

739 Seminar in Information Organization and Retrieval Fall or spring. 4 credits. Prerequisite: Computer Science 635.

[781 Advanced Theory of Computing Fall. 4 credits. Prerequisites: Computer Science 681 and 682, or permission of instructor. Offered alternate years (alternates with Computer Science 782). Not offered 1979–80.]

782 Advanced Theory of Computing Spring. 4 credits. Offered alternate years (alternates with Computer Science 781).

789 Seminar in Automata Theory Fall or spring. 4 credits. 1 seminar. Prerequisite: permission of instructor.

790 Special Investigations in Computer Science Fall or spring. Prerequisite: permission of a computer science adviser.

890 Special Investigations in Computer Science Fall or spring. Prerequisite: permission of a computer science adviser.

990 Special Investigations in Computer Science Fall or spring. Prerequisite: permission of a computer science adviser.

Economics

101 Introductory Economics Fall or spring. 3 credits. Lectures and discussion.
Staff.
Analysis of aggregate economic activity in relation to the level, stability, and growth of national income. Topics discussed may include the determination and effects of unemployment, inflation, balance of payments deficits, and economic development, and how these may be influenced by monetary, fiscal, and other policies.

102 Introductory Economics Fall or spring. 3 credits. Lectures and discussion.
Staff.
Explanation and evaluation of how the price system operates in determining what goods are produced, how goods are produced, and who receives income, and how the price system is modified and influenced by private organizations and government policy.

General Courses

301 Economics of Market Failure Spring. 4 credits. Prerequisite: Economics 102.
P. Weller.
Topic to be announced.

302 The Impact and Control of Technological Change (also Government 302 and City and Regional Planning 440) Spring. 4 credits.
D. Nelkin.
Examines social, environmental, and economic implications of technological change in the United States in the context of possible policies and strategies of control. Several specific cases will be considered in detail, followed by a broader investigation of the problems of a modern technological society. Alternative political-economic solutions will be explored.

[304 Economics and the Law Spring. 4 credits. Prerequisite: 311 or permission of instructor. Not offered 1979–80.]

[306 Economics of Defense Spending Spring. 4 credits. Prerequisite: Economics 102. Not offered 1979–80.
J. Reppy, with guest lectures by visitors to the Cornell Peace Studies Program.
The economic aspects of defense spending are analyzed. Emphasis is on the procurement of weapons systems. Topics covered include an overview of the defense budget, special characteristics of the defense market, the structure of the defense industry, and the economic behavior of defense firms.]

308 Economic Analysis of Government (also Engineering CEE B302) Spring. 4 credits. Prerequisites: one year of college level mathematics plus Engineering CEE B301 or Economics 311.
Staff.
Government intervention in a market economy is analyzed. Public goods, public finance, cost-benefit analysis, environment regulation, and macroeconomic topics are covered.

[309 Capitalism and Socialism (also I&LR 347) Fall. 4 credits. Permission of instructor required. G. H. Hildebrand. Not offered 1979–80.]

311 Intermediate Microeconomic Theory Fall or spring. 4 credits. Prerequisites: Economics 101–102 or permission of instructor. Economics 311.5 has a more mathematical approach and is designed to accommodate students in engineering.
Staff.
The pricing processes in a private enterprise economy are analyzed under varying competitive conditions and their role in the allocation of resources and the functional distribution of national income is considered.

312 Intermediate Macroeconomic Theory Fall or spring. 4 credits. Prerequisites: Economics 101–102 or permission of instructor.
Staff.
The theory of national income determination and economic growth in alternative models of the national economy is introduced. The interaction and relation of aspects of these models of empirical aggregate economic analysis is examined.

[315 History of Economic Thought Fall. 4 credits. Prerequisites: Economics 101–102 or permission of instructor. Not offered 1979–80.]

317 Intermediate Mathematical Economics I Fall. 4 credits.
H. Wan.
Introduction of calculus and matrix algebra; problems of maximization of a function of several variables. Economic examples are used to illustrate and teach the mathematical concepts.

318 Intermediate Mathematical Economics II Spring. 4 credits.
H. Wan.
Advanced techniques of optimization and application to economic theory.

319 Quantitative Methods Fall. 4 credits.
R. Joyeux.

320 Quantitative Methods Spring. 4 credits. Prerequisites: thorough understanding of microeconomic and macroeconomic theory and some elementary calculus.
W. Greene.
The use of quantitative analysis in economics is introduced. Topics include index numbers, input-output analysis, elementary decision theory, and an introduction to hypothesis testing and the formulation and estimation of econometric models.

Economic History

[321 Economic History of Ancient Medieval Europe 4 credits. Prerequisite: permission of instructor. Not offered 1979–80.]

[322 Economic History of Modern Europe: 1750 to the Present Fall. 4 credits. Open to upperclass students with some background in economics or history, or with permission of instructor. M. R. Haines. Not offered 1979–80.]

[323 American Economic History Fall. 4 credits. Prerequisites: Economics 101–102, or permission of instructor. Not offered 1979–80.
Staff.
Problems in American economic history from the first settlements to early industrialization are surveyed.]

[324 American Economic History Fall. 4 credits. Prerequisites: Economics 101–102, or permission of instructor. Not offered 1979–80.]

325 Economic History of Latin America Fall. 4 credits. Open to upperclass students with some background in economics or history, or with permission of instructor.
T. Davis.

Money, Banking, and Public Finance

331 Money and Credit Spring. 4 credits. Prerequisites: Economics 101–102.
U. M. Possen.
A systematic treatment of the determinants of the money supply and the volume of credit. Economic analysis of credit markets and financial institutions in the United States.

333 Theory and Practice of Asset Markets Fall. 4 credits. Prerequisites: Economics 311–312.
E. Burton.
The theory of decision making in the presence of uncertainty and the practical aspects of particular asset markets are examined.

335 Public Finance: Resource Allocation Spring. 4 credits. Prerequisites: Economics 101–102.
M. Gertler.
The role of government in allocating resources through taxes and expenditures is analyzed; emphasis is on the federal government. Criteria for evaluation are developed and applied to specific policies.

[336 Collective Choice: Theory and Applications Fall. 4 credits. Prerequisite: 311, or permission of instructor. Not offered 1979–80.]

338 Macroeconomic Policy Fall. 4 credits. Prerequisite: Economics 312.
U. M. Possen.
The use of fiscal and monetary policies for achieving full employment, price level stability, and appropriate economic growth are studied.

Labor Economics

[341 Labor Economics Fall. 4 credits. Prerequisite: Economics 101–102. W. Galenson. Not offered 1979–80.]

342 Problems in Labor Economics (also I&LR 343) Fall. 4 credits. Prerequisites: Economics 311 or I&LR 240.
R. Ehrenberg.
The theory and empirical analysis of labor markets and their applications to policy issues are considered in depth. Specific topics vary each semester. The course is designed to increase each student's competence in applying microeconomic theory and econometrics to policy issues through an econometric research project.

Organization, Performance, and Control of Industry

351 Industrial Organization Fall. 4 credits. Prerequisites: Economics 101–102. Recommended: Economics 312.
W. Greene.
An examination of the basic factors that lead to less competitive markets in the United States economy, and of the factors that may countervail these factors. Both theoretical and empirical generalizations are emphasized, rather than studies of specific industries. The first third of the course is abstract theoretical modeling of competition, oligopoly, and monopoly markets, followed by an examination of the relationship between market structure (e.g., number of firms and market shares) and its conduct and performance.

352 Public Regulation of Business Spring. 4 credits. Prerequisite: Economics 351 or permission of the instructor.
R. Masson.
Questions of public policy concerning patents and antitrust are surveyed. Incentives of firms under current law are considered. These questions, and, along with theories of social costs, are used to examine how patent laws, antitrust laws, or endorsement policies could best be designed. Some past cases that have shaped the current interpretation of the laws are considered.

[354 Economics of Regulation Spring. 4 credits. Not offered 1979–80.]

355 Economics of the American System of Private Enterprise Fall. 4 credits. Prerequisites: Economics 101–102 and Economics 311–312, or equivalents.
G. H. Hildebrand.
A critical examination of the private sector of the United States economy: its history, some leading current issues involving it, and its relation to theoretical and philosophical interpretations of the market economy.

356 Economics of the American System of Private Enterprise Spring. 4 credits. Prerequisites: Economics 101–102 and Economics 311–312, or equivalents.
G. H. Hildebrand.
For course description, see Economics 355 above.

International and Comparative Economics

361 International Trade Theory and Policy Fall. 4 credits. Prerequisites: Economics 101–102 or permission of instructor.
L. Ebrill.
The principles that have guided the formulation of international trade and commercial policies are surveyed. The evolution of the theory of international trade, principles and practices of commercial policy, problems of regional integration and customs unions, and institutions and practices of state trading are considered.

362 International Monetary Theory and Policy Spring. 4 credits. Prerequisites: Economics 101–102 or permission of instructor.
L. Ebrill.
The principles that guided the formulation of international financial policies are surveyed. The evolution of the theory of balance of payments adjustment, international monetary standards, international capital movements, economic aid, international monetary institutions, and proposals for international monetary reforms are considered.

[364 The United States in the World Economy Spring. 4 credits. Prerequisites: Economics 101–102 or permission of instructor. Not offered 1979–80.]

[365 Economic Policy and Development in Southeast Asia Spring. 4 credits. Prerequisite: permission of instructor. Not offered 1979–80.]

[366 Introduction to the Japanese Economy Spring. 4 credits. Not offered 1979–80.]

367 Comparative Economic Systems: Soviet Union and Europe Fall. 4 credits.
G. J. Staller.
Discussion of approaches to comparison of economic systems. Consideration of abstract models (market economy, central planning, decentralized socialist market) as well as national economies (France and Sweden, Yugoslavia and Soviet Union). Possibility of convergence of economic systems is explored.

368 Comparative Economics: United States, Europe, and the Soviet Union Spring. 4 credits. Prerequisites: Economics 101–102. Intended for students who are not majoring in economics.
G. Staller.
European and Soviet economies after the Second World War are surveyed. The European countries studied include France, Sweden, and Italy in the West, and Yugoslavia plus another country in the East. A descriptive and institutional approach is used and designed for nonmajors.

Economic Growth and Development

371 Process of Economic Development Fall. 4 credits.
F. Golay.
The problem of sustaining accelerated economic growth in less developed countries is studied. Trade-offs between growth, welfare, and equity; the legacy of colonialism; relevance of history and economic theory; problems of capital formation; economic planning and international specialization; and the interaction of industrialization, agricultural development, and population change are emphasized.

[372 Applied Economic Development Spring. 4 credits. F. Golay. Not offered 1979–80.]

378 Economics, Population, and Development Fall. 4 credits.
R. Avery.
The economic aspects of population and the interaction between population change and economic change are introduced. Particular attention is paid to economic views of fertility, mortality, and migration, and to the impact of population growth on economic growth, development, modernization, resources, and the environment.

381 Economics of Workers' Management in Yugoslavia Fall. 4 credits. Prerequisites: Economics 311–312 or permission of instructor.
J. Svejnar.
The doctrine and practice of self-management and workers' cooperation is surveyed, and the organizational structure and institutional form of the participatory economy is studied. Special attention is given to the outcome of the decision-making process at the level of the enterprise, the consistency of these outcomes with national plans, and the policies used to implement them. Examples are drawn from the Yugoslav experience and, depending on student interest, the discussion may cover other foreign experiences such as those of Algeria, the Basque region, Chile, Israel, Peru. Emphasis is on new developments and new possibilities of implementing democratic, worker-owned and worker-managed enterprises in the United States. Appropriate institutions and legal forms of self-management in the United States are examined using theoretical analyses developed in the course.

382 The Practice and Implementation of Self-Management Spring. 4 credits. Prerequisite: Economics 311–312 or permission of the instructor.
J. Vanek.
The various forms of labor participation in the world today are described, and how producer cooperatives and labor-managed firms and systems can be created is explained. Extensive use is made of the theory of labor-managed systems. The history of various doctrines and self-managed experiences is considered.

Related Course in Another Department

Comparative Economic System: Soviet Russia (I&LR 344)

Honors Program

391 Honors Seminar Fall. 4 credits. Required of all seniors honors candidates.
S. C. Tsiang.
Selected readings in the economics of public issues.

392 Honors Seminar Spring. 4 credits. Required of all senior honors candidates.
S. Marston.
A continuation of Economics 391.

399 Readings in Economics Fall or spring. Variable credit.
Department faculty.

Graduate Courses and Seminars

503 Nonparametric Methods for Peace Scientists and Regional Scientists Fall. 4 credits.
W. Isard.
Topics to be covered include: advantages and disadvantages of parametric and nonparametric methods; problems involved in measurement; nonparametric methods based on one sample and many samples; nonparametric methods requiring only nominal measurement, and those requiring only ordinal measurement; nonparametric measures of association; procedures for non-normal distributions.

[504 Economics and the Law Fall. 4 credits. Not offered 1979–80. Staff. See Economics 304 for course description.]

505 Interdependent Decision Making Fall. 4 credits.
W. Isard.
The basic elements in interdependent decision-making situations are examined. Situations where decision makers have different sets of objectives which they wish to achieve and employ different criteria for evaluating performance are focused on. The use of maximizing incremental procedures, game theory, and diverse methods for establishing priorities and cooperative action as well as recursive, interactive approaches to resolve conflict are considered. Coalition theory and related topics are covered.

509 Microeconomic Theory I Fall. 4 credits.
R. Masson.
Topics in consumer and producer theory.

510 Microeconomic Theory II Spring. 4 credits.
M. Majumdar.
Topics in consumer and producer theory, equilibrium models and their application, externalities and public goods, intertemporal choice, simple dynamic models and resource depletion, choice under uncertainty.

513 Macroeconomic Theory: Static Income Determination Fall. 4 credits.
M. Gertler.

514 Macroeconomic Theory: Dynamic Models, Growth, and Inflation Spring. 4 credits.
U. Possen.

517 Intermediate Mathematical Economics I Fall. 4 credits.
H. Wan.

518 Intermediate Mathematical Economics II Spring. 4 credits.
H. Wan.
See Economics 318 for course description.

519 Quantitative Methods Spring. 4 credits.
R. Joyeux.

520 Quantitative Methods Fall. 4 credits.
Prerequisites: good control of micro- and macroeconomic theory and some knowledge of calculus, linear algebra and probability; or permission of instructor.
R. Joyeux.
The application of quantitative analysis to testing of economic theories provides a framework for study and evaluation of cross-section and time-series data, methodology and theory of economic measurement, statistical techniques, empirical studies, and economic forecasting.

[521 Economic History of Ancient Medieval Europe Fall. 4 credits. Not offered 1979–80.]

[522 Economic History of Modern Europe: 1750 to the Present Fall. 4 credits. M. R. Haines. Not offered 1979–80.]

[523 American Economic History Fall. 4 credits. Not offered 1979–80.
Staff.
See Economics 323 for course description.]

[524 American Economic History Spring. 4 credits. P. D. McClelland. Not offered 1979–80.]

525 Economic History of Latin America Fall. 4 credits.
T. E. Davis.
See Economics 325 for course description.

[536 Collective Choice: Theory and Applications Spring. 4 credits. Not offered 1979–80.]

551 Industrial Organization Fall. 4 credits.
W. Greene.
See Economics 351 for course description.

552 Public Regulation of Business Spring. 4 credits.
R. Masson.
See Economics 325 for course description.

555 Economics of the American System of Private Enterprise Fall. 4 credits. Prerequisites: Economics 101–102 and Economics 311–312 or equivalents.
G. H. Hildebrand.
See Economics 355 for course description.

556 Economics of the American System of Private Enterprise Spring. 4 credits. Prerequisites: Economics 101–102 and Economics 311–312 or equivalents.
G. H. Hildebrand.
See Economics 356 for course description.

561 International Trade Theory and Policy Fall. 4 credits. Prerequisites: Economics 101–102 or permission of instructor.
L. Ebrill.
See Economics 361 for course description.

562 International Monetary Theory and Policy Spring. 4 credits. Prerequisites: Economics 101–102 or permission of instructor.
E. Grinols.
See Economics 362 for course description.

565 Economic Problems of Latin America Spring. 4 credits.
T. E. Davis.

[566 Introduction to the Japanese Economy Spring. 4 credits. Not offered 1979–80.]

567 Comparative Economic Systems: Soviet Union and Europe Fall. 4 credits.
G. J. Staller.
See Economics 367 for course description.

568 Comparative Economics: United States, Europe, and Soviet Union Spring. 4 credits. Prerequisites: Economics 101–102.
G. Staller.
See Economics 368 for course description.

571 Public Policy and Economic Development Fall. 4 credits.
F. Golay.
See Economics 371 for course description.

[572 Applied Economic Development Spring. 4 credits. F. Golay. Not offered 1979–80.]

578 Economics, Population, and Development Fall. 4 credits.
R. Avery.
See Economics 378 for course description.

581 Economics of Workers' Management in Yugoslavia Fall. 4 credits. Prerequisites: Economics 311–312, or permission of instructor.
J. Svejnar.
See Economics 381 for course description.

582 The Practice and Implementation of Self-Management Spring. 4 credits.
See Economics 382 for description.

599 Readings in Economics Fall or spring. Variable credit.
Department faculty.

603 Seminar in Peace Science Fall. 4 credits.
W. Isard.
Among topics to be covered at an advanced level are: game theory, coalition theory, bargaining and negotiation processes, cooperative procedures, micro-behavior models, macro-social processes, and general systems analysis.

611 Advanced Microeconomic Theory Spring. 4 credits.
H. Wan.

612 Advanced Macroeconomic Theory Fall. 4 credits.
S. Marston.

617 Mathematical Economics Spring. 4 credits.
Staff.

618 Mathematical Economics Fall. 4 credits.
D. Easley.

619 Econometrics Fall. 4 credits. Prerequisites: calculus and linear algebra. Recommended: Economics 520 or equivalent.
L. Phlips.
Detailed examination of regression models at the level of H. Theil, *Principles of Econometrics*. Emphasis is on theoretical aspects rather than practical applications. Topics include distribution theory and the use of sufficient statistics, the classical regression model, generalized least squares, modified generalized least squares, and the multivariate regression model.

620 Econometrics Spring. 4 credits. Prerequisites: calculus and linear algebra plus Economics 619 or permission of instructor. Recommended: Economics 520 or equivalent.
L. Phlips.
Advanced topics in econometrics, such as asymptotic distribution theory, errors in variable and latent variable models (e.g. factor analysis), simultaneous equation models with particular attention to problems of identification, time series analysis, qualitative response models, and aggregation.

[623 American Economic History Fall. 4 credits. Not offered 1979–80.]

[624 American Economic History Spring. 4 credits. Not offered 1979–80.]

[626 Methods in Economic History Spring. 4 credits. Not offered 1979–80.]

631 Monetary Theory and Policy Fall. 4 credits.
S. Tsiang.

632 Monetary Theory and Policy Spring. 4 credits.
S. Tsiang.

635 Public Finance: Resource Allocation and Fiscal Policy Fall. 4 credits.
L. Ebrill.

636 Public Finance: Resource Allocation and Fiscal Policy Spring. 4 credits.
L. Ebrill.

[638 Public Finance: Local Government and Urban Structure Fall. 4 credits. R. E. Schuler. Not offered 1979–80.]

641 Seminar in Labor Economics Fall. 4 credits.
R. Ehrenberg.

642 Seminar in Labor Economics Spring. 4 credits.
R. Butler.

[644 The Labor Market and Public Policy: A Comparative View Spring. 4 credits. Not offered 1979–80.]

647 Economics of Evaluation (also I&LR 647)
R. Ehrenberg.
See I&LR 647 for course description.

[648 Issues in Latin America Spring. 4 credits. Not offered 1979–80.]

651 Industrial Organization and Regulation Fall. 4 credits.
G. Hay.

652 Industrial Organization and Regulation Spring. 4 credits.
R. Masson.

661 International Economics: Pure Theory and Policy Fall. 4 credits.
E. Grinols.

662 The International Economic Order Fall. 4 credits. Prerequisites: Economics 361–362 and acquaintance with conventional trade analysis.
J. Vanek.
Conventional international economics is becoming increasingly irrelevant in explaining major international trade and finance phenomena of the world. Discussions attempt to (1) present a systematic critique of neoclassical trade and exchange theory; (2) purify analytical tools using empirical observations; (3) incorporate analysis from the Marxian and unequal exchange tradition, and (4) produce an overall synthesis, especially with respect to international economic relations between poor and rich countries.

664 International Economics: Balance of Payments and International Finance Spring. 4 credits.
S. C. Tsiang.

[670 Economic Demography and Development Fall. 4 credits. M. R. Haines. Not offered 1979–80.]

671 Economics of Development Spring. 4 credits.
E. Thorbecke.

672 Economics of Development Fall. 4 credits.
G. Fields.

673 Development in a Polarized World Fall. 4 credits. Prerequisites: Economics 311–312.
F. Golay.
The impact of the international economic order on the development efforts of less-developed countries. Emphasis is on such topics as the gains from trade, commercial policy and industrialization, risks of specialization, synthesis of development theory and trade theory, the North-South confrontation, proposals for reform of the international economic order, commodity agreements and development, international income transfers, and direct foreign investment.

[674 Economic Systems Spring. 4 credits. G. J. Staller. Not offered 1979–80.]

[678 Economic Growth in Southeast Asia Spring. 4 credits. Not offered 1979–80.]

679 Theory of Quantitative Economic Policy Spring. 4 credits.
M. Gertler.

681 Economics of Participation and Labor-Managed Systems: Theory Fall. 4 credits.
J. Vanek.
The theory of labor-managed economies is developed systematically and literature on that and related subjects is surveyed. Theories of the participatory firm, industry and general equilibrium are covered together with a microeconomic theory and analysis of special dimensions of the system. Efficient decision-making processes within the firm are also studied. Illustrative references to Yugoslavia and other real instances of labor participation are made throughout.

682 The Practice and Implementation of Self-Management Spring. 4 credits.
J. Svejnar.

684 Seminars in Advanced Economics Fall or spring. Variable credit.
M. Majumdar, S. Slutsky.

English

Students should consult the *Announcement of Academic Information* and the department's guide, "Suggestions for Prospective Majors in English."

Courses for Sophomores

Although courses numbered in the 200s are primarily for sophomores, some of them are open to qualified freshmen and to upperclass students. Courses approved for the major are English 201, 202, and all courses numbered 300 or above except English 496, 570, 571, 575, 576, 578, and 579. In addition to English 201–202, students may count up to two 200-level courses toward the major from "Courses Approved for the Major," listed below.

201–202 The English Literary Tradition 201, fall; 202, spring. 4 credits each term. Open to all undergraduates. English 201 is not a prerequisite to 202. May be counted toward the English major.
Fall: M W F 11:15; T. Hill, S. Elledge. Spring: M W F 11:15; M. H. Abrams.
Interpretation of major works ranging from *Beowulf* through those of Yeats. English 201 surveys Old English poetry, Chaucer, medieval romances, Spenser, Shakespeare, Donne, and Milton. 202 includes Dryden, Swift, Pope, Samuel Johnson, Blake, Jane Austen, the major Romantic and Victorian poets, Shaw, and Yeats. The course will be conducted by a combination of lectures and intensive seminars in special topics.

Courses Primarily for Nonmajors

205–206 Readings in English and American Literature 205, fall; 206, spring. 3 credits each term. Open to all undergraduates. English 205 is not a prerequisite to 206.
Fall: M W F 10:10; R. T. Farrell. Spring: M W F 10:10; S. M. Parrish.
English 205 surveys masterpieces of English prose and verse from the Elizabethan period to the middle of the nineteenth century, including selections from the works of Shakespeare, Donne, Swift, Austen, Byron, Hawthorne, Poe, and others. Informal lectures and discussion. Midterm and final examinations; papers optional. 206 covers literature since the mid-nineteenth century, including such authors as Browning, Shaw, D. H. Lawrence, Hardy, Yeats, Hemingway, Faulkner, and Robert Frost. Two lectures and a small discussion section each week. Two short papers and a final.

227 Shakespeare Fall or spring. 3 credits. Each section limited to 25 students.
M W F 1:25– or T R 12:20–1:35 or 2:30–3:45.
B. Rosecrance, S. M. Parrish, and others.
A critical study of representative plays from the principal periods of Shakespeare's career.

288–289 Expository Writing 288, fall; 289, spring. 3 credits each term. Each section limited to 18 students.
M W 9:05 or 10:10 or T R 2:30; plus conferences to be arranged. N. H. Hertz, P. Sawyer, N. Kaplan, and staff.
Primarily for non-English majors who wish practice in various kinds of expository writing — definition, analysis, comparison, contrast, argument — applied to students' particular disciplines and interests. Frequent short essays, complemented by discussion of writings by good authors.

Courses Approved for the Major

Students may take up to two of the following 200-level courses for credit toward the English major.

207 Twentieth-Century Biography Spring. 4 credits.
M W F 12:20. D. Novarr.
An introduction to some forms of modern biography, traditional and experimental, to see how writers have represented and illuminated character and events. Critical study of such texts as Freud's *Leonardo da Vinci*, Strachey's *Eminent Victorians*, Woolf's *Orlando*, and Erikson's *Young Man Luther*. Some consideration of the values of biography, of the problem of biographical "truth," and of the relation of biography to various disciplines and to other literary forms.

247 Major Nineteenth-Century Female Novelists (also Women's Studies 248) Fall. 4 credits.
M W F 1:25. J. F. Blackall.
Readings include Austen, *Persuasion;* E. Brontë, *Wuthering Heights;* C. Brontë, *Jane Eyre* and *Villette;* Gaskell, *Mary Barton* or *North and South;* Stowe, *Uncle Tom's Cabin;* Eliot, *The Mill on the Floss;* Chopin, *The Awakening;* and two imaginative sequels to *Jane Eyre* — James's "The Turn of the Screw" and Jean Rhys's *Wide Sargasso Sea*. In addition to examining the novels as works of fiction, the course will consider the biographical and social circumstances surrounding these works, their critical reception within their own time, and the themes and subject matter that these novelists elected to write about.

253 The Modern Novel Fall. 4 credits.
T R 8:40–9:55. B. Rosecrance.
A survey of English, European, and American novels and shorter fiction, with some attention to their contemporary historical and intellectual contexts. Works by such writers as Conrad, Joyce, Lawrence, Forster, Woolf, Mann, Kafka, Nabokov, Wharton, and Faulkner will be considered.

254 Modern Poetry Spring. 4 credits.
M W F 11:15. R. Kirschten.
We will trace major emotional and technical achievements in British and American lyric poetry in the modern period. Emphasis is on the lyric voice and its bases of appeal in eliciting reader response. Poets featured include Hopkins, Yeats, Eliot, Frost, Stevens, Cummings, Dylan Thomas, and Marianne Moore.

267 Twentieth-Century Southern Fiction Spring. 4 credits.
M W F 12:20. L. Herrin.
The course will deal exclusively with the fiction of the twentieth-century American South — arguably, in time and place, the richest concentration of writers we have — and will proceed more or less chronologically. After a brief background survey, the course will begin with William Faulkner, then move to Thomas Wolfe, James Agee, and Robert Penn Warren. The stories and short novels of Katherine Anne Porter, Flannery

O'Connor, Carson McCullers, and Eudora Welty will make up one section of the course, as will the short work of three black writers, Richard Wright, Ernest Gaines, and Gayl Jones. The semester will end with novels by two contemporaries, William Styron and Walker Percy, and, if time permits, by one or two others. Short interpretative papers and class discussion.

290 Literature and Value Spring. 4 credits.
T R 12:20–1:35. J. McConkey and staff.
Each week a different member of the department discusses a poem, group of poems, story, play, or novel that is of particular importance to him or her, perhaps as a work that contributed to the person's decision to devote a lifetime to the study of literature or to the writing of fiction or verse, perhaps as a work that has affinity with their present-day attitudes and values. In following meetings that week, class members will discuss in detail the same or related works. Students will be encouraged to explore, in their papers for the course as well as in their discussions, the relationship between specific texts and their own experiences, attitudes, and values.

Courses Which Satisfy the Major Prerequisite

270 The Reading of Fiction Fall or spring.
3 credits. Recommended for prospective majors in English. Fall: open to freshmen who have received advanced placement in English. Spring: open to other qualified freshmen. Upperclass students admitted as space permits. Each section limited to 22 students. May be used to satisfy either the Freshman Seminar requirement or the distribution requirement in the humanities, but not both.
M W F 1:25 or 2:30 or 11:15 or T R 12:20–1:35 or 10:10–11:25. D. Novarr, S. Siegel, H. Shaw, J. F. Blackall, T. Jeffers, and staff.
Forms of modern fiction, with emphasis on the short story and novella. Critical study of works by English, American, and Continental writers from 1880 to the present — Chekhov, James, Conrad, Faulkner, Mann, Kafka, and others.

271 The Reading of Poetry Fall or spring.
3 credits. Recommended for prospective majors in English. Fall: open to freshmen who have received advanced placement in English. Spring: open to other qualified freshmen. Upperclass students admitted as space permits. Each section limited to 22 students. May be used to satisfy either the Freshman Seminar requirement or the distribution requirement in the humanities, but not both.
M W F 10:10 or 11:15 or T R 10:10–11:25.
P. Marcus, D. Mermin, and staff.
Designed to sharpen the student's ability to understand and respond to poetry. Readings in the major periods, modes, and genres of poetry written in English.

272 Introduction to Drama Fall or spring.
3 credits. Recommended for prospective majors in English. Fall: open to freshmen who have received advanced placement in English. Spring: open to other qualified freshmen. Upperclass students admitted as space permits. Each section limited to 22 students. May be used to satisfy either the Freshman Seminar requirement or the distribution requirement in the humanities, but not both.
Fall: T R 10:10–11:25 or 2:30–3:45; spring: M W F 11:15 or 12:20. A. Caputi, T. Murray, and others.
Selected masterworks by such playwrights as Sophocles, Ibsen, and Shaw introduce the chief idioms and styles of Western dramatic tradition. The course work will consist of discussions and papers, as well as a special project related to the plays being produced by the Department of Theatre Arts. The course will be taught in small sections.

275 The American Literary Tradition Fall.
3 credits. Recommended for prospective majors in American studies.
M W F 11:15. R. H. Elias.
The problem of an American national literature is explored through the reading and discussion of eight texts representing the four principal periods in American literary history. Not a survey, this course focuses on the relations of the texts to each other, the role of Americanness in those relationships, and the assumptions about history with which critical appreciation must engage. Among the writers whose work is studied are Franklin, Hawthorne, Thoreau, Mark Twain, Henry James, Frost, and Faulkner.

280–281 Creative Writing 280, fall; 281, spring.
3 credits each term. Recommended for prospective majors in English. Prerequisite for English 281: recommendation from English 280 instructor. Each section limited to 18 students.
M W 9:05 or 2:30 or 3:35 or T R 9:05 or 12:20 or 2:30. E. Rosenberg, K. McClane, L. Herrin, R. Kirschten, M. Anderson, J. McConkey, D. McCall, and others.
An introductory course in the theory and practice of writing narrative prose, poetry, and allied forms.

Courses for Sophomores, Juniors and Seniors

Courses at the 300 level are open to juniors and seniors, and to others with the permission of the instructor. There are no prerequisites, except as noted for English 382–383 and 384–385.

Major Periods of English Literature

310 Old English Literature in Translation Fall.
4 credits.
M W F 1:25. T. D. Hill.
Cultural backgrounds, reading, and critical analysis of Anglo-Saxon poetry in translation, pagan and Christian epic, elegy, heroic legend, and other forms. Attention will be given to the relations of this literature to that of later periods.

313 Middle English Literature in Translation Spring. 4 credits.
M W F 1:25. R. Kaske.
Readings from Middle English literature in translation, excluding Chaucer. Though selections vary, Arthurian romances such as Lagamon's *Brut*, the *Alliterative Morte Arthure*, *Sir Gawain and the Green Knight*, and Malory's *Morte d'Arthur*; Middle English lyrics and plays; and major poems such as *Piers Plowman*, *The Pearl*, and the other works of the *Gawain*-poet, Gower's *Confessio Amantis*, *The Owl and the Nightingale*, and *The Land of Cokaygne*.

320 Renaissance Literature Spring. 4 credits.
M W F 10:10. B. B. Adams.
The major literary movements of the sixteenth and seventeenth centuries are surveyed, with particular attention to the works of Spenser, Marlowe, Shakespeare, Donne, Jonson, Webster, Herbert, and Milton.

330 Restoration and Eighteenth-Century Literature Spring. 4 credits.
M W F 1:25.
A broad survey covering works by the major poets, dramatists, and novelists of the period, with particular emphasis on Dryden, Pope, Swift, Fielding, Sterne, and Johnson.

333 The Eighteenth-Century English Novel Fall.
4 credits.
M W F 1:25. H. Shaw.
Form and meaning in the eighteenth-century English novel. The course concentrates first on Richardson and Fielding, then on experiments with novel form toward the end of the century, and finally on the ways in which Austen and Scott draw upon and transform elements of the eighteenth-century tradition in fiction. Works by Defoe, Richardson, Fielding, Sterne, Smollett, Radcliffe, Austen, and Scott.

340 The Romantic Poets Fall. 4 credits.
M W F 11:15. S. M. Parrish.
A close reading of the poems of Blake, Coleridge, Wordsworth, Byron, Shelley, and Keats, together with some of their letters and their critical writings.

345 The Victorian Period Spring. 4 credits.
T R 12:20–1:35. D. Mermin.
Tennyson, Browning, and Arnold and two major novels, *Great Expectations* and *Middlemarch*, are emphasized. Other readings include autobiographical, aesthetic, political, and scientific prose; poetry by Swinburne and the Pre-Raphaelites; and a play by Shaw.

350 The Early Twentieth Century to 1914 Fall.
4 credits.
M W F 10:10. S. Siegel.
Interpretations of English and Anglo-Irish poetry, fiction, and drama. Writers include Wilde, Hardy, Conrad, Lawrence, Joyce, Eliot, Yeats, Woolf, and others. Although the emphasis is on individual works, the authors and their achievements are considered within the wider context of literary, intellectual, and social history. Topics for discussion include feminism, the aesthetic movement, the Abbey Theatre, Imagism, Modernism, and Bloomsbury.

351 Modern Literature since 1914 Spring.
4 credits.
M W F 11:15. J. Stallworthy.
Interpretations of modern English, Anglo-Irish, and Anglo-Welsh poetry, fiction, and drama by Yeats, Shaw, Lawrence, Eliot, Forster, Woolf, Waugh, O'Casey, Auden, Beckett, and others. Although the emphasis in lectures and discussions is upon individual works, the wider context of literary, intellectual, and social history is also considered.

Major English Authors

319 Chaucer Fall. 4 credits.
M W F 12:20. W. Wetherbee.
The main emphasis is on *Troilus* and *The Canterbury Tales*, but some attention will also be given to the early poems and the question of Chaucer's development as a poet.

321 Malory and Spenser Fall. 4 credits.
T R 10:10–11:25. C. Kaske.
Paired selections covering about half of both Malory's *Morte d'Arthur* and Spenser's *Faerie Queene*. Chrétien's romances and some of Spenser's minor poems are mentioned occasionally as background. Comparisons assess possible literary influence, the distinctive genius of each author as a writer of romance, and the development of Arthurian romance from the Middle Ages to the Renaissance.
Students wishing to read the entire *Faerie Queene* may plan to take English 621 in 1980–81.

327 Shakespeare Fall. 4 credits.
M W F 9:05. H. S. McMillin.
An introduction to the works of Shakespeare, based on a selection of plays representative of the stages of his artistic development and the range of his achievement.

329 Milton Fall. 4 credits.
M W F 10:10. D. Novarr.
Milton's poetry and selected prose is studied, with emphasis on *Paradise Lost*.

Major Periods of American Literature

361 Early American Literature Fall. 4 credits.
M W F 11:15. M. J. Colacurcio.
The literature of ideas produced by America's Puritan and Enlightenment writers: Bradford, Taylor, Edwards, and Franklin. The first achievements of the national literature: Irving, Cooper, Poe, and Hawthorne.

362 The American Renaissance Spring. 4 credits.
M W F 11:15. S. C. Strout.
America's literary maturity at mid-century: the individual masterpieces and the interrelated careers of Emerson, Thoreau, Hawthorne, Melville, Whitman, and Dickinson.

363 The Age of Realism and Naturalism Fall. 4 credits.
M W F 10:10. R. H. Elias.
The literary expression of new attitudes toward American society and the individual between the Civil War and the early years of the twentieth century, primarily as exemplified in representative writings by Mark Twain, W. D. Howells, Henry James, Mary Wilkins Freeman, Charles W. Chesnutt, Henry Adams, Stephen Crane, and Theodore Dreiser.

364 American Literature in the Twentieth Century Spring. 4 credits.
M W F 11:15. J. Bishop.
A pursuit of the idea of modernity through a variety of American texts from just before the First World War to the present. The authors represented include the principal poets from Frost to Lowell; Fitzgerald, Hemingway, and Faulkner from the standard writers of prose fiction; and some more recent black writers, women writers, critics, and journalists.

Genres and Special Topics

366 The Earlier American Novel: Brockden Brown to Henry James Fall. 4 credits.
T R 2:30–3:45. D. E. McCall.
A survey of major American novels of the nineteenth century. Writers studied include Hawthorne, Melville, Mark Twain, Howells, Chopin, and James.

367 The Modern American Novel Spring. 4 credits.
T R 2:30–3:45. W. Slatoff.
A survey of major American novels of the twentieth century. Writers studied include Dreiser, Crane, Fitzgerald, Hemingway, West, Wright, Faulkner, Agee.

370 The Nineteenth-Century English Novel Spring. 4 credits.
M W F 12:20. T. L. Jeffers.
Survey of works by major English novelists in the nineteenth century. Reading list: Austen, *Emma;* Thackeray, *Vanity Fair;* Brontë, *Wuthering Heights;* Dickens, *Little Dorrit;* Eliot, *Adam Bede;* Hardy, *Tess of the d'Urbervilles;* Conrad, *Nostromo.*

372 Representative English Dramas Spring. 4 credits.
T R 12:20–1:35. A. Caputi.
A study of important events in the English theater from its beginnings to the early twentieth century. Plays by Marlowe, Shakespeare, Jonson, Webster, Dryden, Wycherley, Congreve, Sheridan, Shelley, Robertson, Shaw, and others.

Creative and Expository Writing

382–383 Narrative Writing 382, fall; 383, spring. 4 credits each term. Prerequisite: English 280–281 or permission of instructor. Each section limited to 15 students.
T R 12:20 or 2:30; plus conferences to be arranged. J. McConkey, W. Slatoff, L. Herrin.
The writing of fiction; study of models; analysis of students' work.

384–385 Verse Writing 384, fall; 385, spring. 4 credits each term. Prerequisite: English 280–281 or permission of instructor. Each section limited to 15 students.
T 2:30–4:25. A. R. Ammons, K. McClane.
The writing of poetry; study of models; analysis of students' poems; personal conferences.

388–389 The Art of the Essay 388, fall; 389, spring. 4 credits each term. Prerequisite: permission of instructor. Each section limited to 18 students.
T R 11:15 and conferences to be arranged. C. Levy, L. Green.
For both English majors and nonmajors who have done well in such courses as freshman seminar or English 288-289, and who desire intensive practice in writing expository and personal essays; particular, but not exclusive, emphasis on expository techniques of analysis and persuasion.

Advanced Undergraduate Courses

Most courses of the 400 level are limited in enrollment and require the permission of the instructor.

402 History of Criticism Fall. 4 credits.
M W F 1:25. R. Kirschten.
Readings in the major critical texts of Plato, Aristotle, Horace, Longinus, Sidney, Coleridge, Wordsworth, Kenneth Burke, and others. The evolution of two concepts, "power" and "form," are traced in these writers.

407 Seminar in the Theory and Practice of Translation (also English 607) Fall. 4 credits. Limited to 15.
T 3:35–5:30. E. G. Fogel.
Students produce finished translations of works they have chosen. The work of notable modern translators is evaluated to help clarify the principles of translation. Literal, free, and faithful translation; paraphrase and imitation; problems of prosody, rhetoric, and style; archaic, colloquial, and standard diction; self-translation (Nabokov and others); translation as interpretation and vice versa; and translation and literary influence are considered.

414 The Middle English Lyric and the European Tradition (also English 614) Spring. 4 credits. Open to graduate students and qualified undergraduates. Recommended: knowledge of one Romance language.
W 1:25–3:20. T. D. Hill.
A survey of the Middle English lyric with emphasis on its relationship to the continental European lyric tradition.

415 The English Language (also English 615) Spring. 4 credits.
T R 3:35–4:50. R. T. Farrell.
Intended as a basic course for those interested in the historical development of English, starting with the Anglo-Saxon period. Short literary texts from each period are studied. If time permits and there is sufficient interest, general topics, such as semantics and linguistic study of literary texts, will be discussed.

Graduate students who already have preparation in Old and Middle English should consult the professor about taking the course as English 796, Teaching and Research: Problems in the Study of the English Language.

422 Readings in the English Renaissance (also English 622) Spring. 4 credits.
M W F 11:15. B. Rosecrance.
Poetry and prose of the later sixteenth and seventeenth centuries (to 1660). An exploration of important texts and intellectual contexts. Some representative writers are Sidney, Campion, Jonson, Donne, Marvell, Herbert, Crashaw, Bacon, Burton, Browne, Hobbes, and Milton.

424 Lyric Sequences (also English 624) Fall. 4 credits. Limited to 15 students.
M 1:25–3:20. C. Levy.
The art of the lyric sequence and a sketch of its history from Dante's *La vita nuova* and Petrarch's *Canzoniere* (in translation as necessary) to Meredith's *Modern Love* and Berryman's *Sonnets.* About half the semester will be devoted to works of Sidney, Greville, Spenser, and Shakespeare.

427 Studies in Shakespeare Spring. 4 credits.
T R 12:20–1:35.
Topic for 1980 to be announced.

428 Elizabethan and Jacobean Drama Spring. 4 credits. Limited to 15 students.
M W F 1:25. D. Novarr.
Critical study of plays by Marlowe, Marston, Jonson, Webster, Beaumont, Fletcher, Ford, and others. The development of dramatic forms and the main currents of ideas in dramatic representation by contemporaries of Shakespeare and Donne.

434 Drama of the Restoration and Eighteenth Century Fall. 4 credits.
M W F 10:10. D. D. Eddy.
Major playwrights of the Restoration and the eighteenth century, including Dryden, Wycherley, Etherege, Otway, Congreve, Gay, Goldsmith, and Sheridan.

446 The Intellectual Heritage of Victorian England Spring. 4 credits.
T R 10:10–11:25. P. Sawyer.
This course focuses on two issues of English intellectual history that are as important to us today as they were to the Victorians — the critique of industrial society and the conflict between scientific knowledge and the passionate experience of nature. Both ideas and the voices behind the ideas are considered, and what makes an intellectual statement a work of literature as well is discussed. The readings may include *The Condition of the Working Classes, Communist Manifesto, On Liberty, Culture and Anarchy, Sartor Resartus, Origin of Species, Father and Son,* and two works of fiction — *Hard Times* and a novella by Lawrence.

453 Aesthetes and Decadents: the 1890s Fall. 4 credits.
M W F 12:20. S. Siegel.
The social thought of the turn of the century is introduced through the controversies that divided the leading literary figures: the origin of religion, the subjugation of women, colonial rule, the value of science, and the role of the poet. The questions raised and resolved during the decade by literary artists, critics and historians, ethnographers, and folklorists are examined. An attempt is made to see the era as its contemporaries did. Whether or not such a recovery is possible, and, if so, what constitutes success is of central concern. Readings include Pater, Wilde, Symons, Yeats, Hardy, Beardsley, Beerbohm, Lang, and Frazer, as well as periodical literature of the time.

454 Three Modern Poets and Theorists Fall. 4 credits.
M W F 1:25. L. Green.
An analysis of texts, pretexts, and contexts in modern poetry. Readings are selected from three modernist poets (Pound, Eliot, and Stevens) and from three modernist critics of textuality (Saussure, Freud, and Marx). Some understanding of modernism is attempted.

458 Yeats and Woolf Fall. 4 credits.
M W F 9:05. P. L. Marcus.
An in-depth study of major poems and plays by Yeats and of Woolf's novels *Jacob's Room, Mrs. Dalloway, To the Lighthouse, The Waves,* and *Between the Acts.* Topics include the impact of the First World War; tradition and experiment, male and female, the significance of art.

461 Twentieth-Century British Poetry Spring. 4 credits.
M W F 2:30. J. Stallworthy.
Starting with Hardy and Yeats, whose work provides a strong bridge from the nineteenth century, and with Hopkins, the principal movements and groupings in subsequent British poetry are considered: imagists, modernists, Georgians, poets of the First World War, Sitwellists, surrealists, and poets of the 1930s, the

Second World War, and the Movement. Using *The Norton Anthology of Modern Poetry*, edited by Richard Ellmann and Robert O'Clair (1973), each session concentrates on individual poems by a particular poet or group of poets including those who, like Robert Graves, remain independent of any school or group. Contemporary poets such as Larkin, Hughes, Heaney, Hill, and Tomlinson are also included.

463 The Political Novel in America Fall. 4 credits. Limited to 15 students.
T R 12:20–1:35. C. Strout.
Critical study of radical, conservative, and liberal politically oriented novels by important writers from 1869 to 1971. Examples from Adams, Twain, James, Steinbeck, Dos Passos, Hemingway, Warren, Ellison, Doctorow, and others. The novel is considered both as a source of insight and as a historical source.

464 American History and the Literary Imagination (also English 691) Fall. 4 credits.
W 1:25–3:20. C. Strout.
The interplay between the literary and historical imaginations in various forms of narrative are examined. Certain controversial American events are focused on, such as the Salem Witchcraft trial, the Nat Turner slave revolt, Huey Long's career, the Oppenheimer Security Hearing, the Rosenberg spy case, and the March on the Pentagon. Texts include literary works by Hawthorne, Adams, Twain, Mailer, Styron, Warren, Miller, and Doctorow; pertinent documents; and readings in controversies over interpretation and the overlap between history and literature.

467 Studies in Afro-American Literature: Hughes, Wright, Baldwin, Morrison Fall. 4 credits. Limited to 15 students.
M W F 11:15. K. McClane.
The works and attitudes of four major Afro-American writers are examined. Emphasis is on those traditions and motifs which inform Afro-American literature. Since much of black literature is a response to historical imperatives the weight of the past must be considered, but aesthetic criteria are applied. New definitions are created if necessary.

468 Seminar in American Culture: The Thirties Spring. 4 credits.
R 1:25–3:20. R. H. Elias.
Social realism and documentary expression, mainly in fiction but also in the context of the social problems and political attitudes that gave rise to and sustained the New Deal. Topics include the Scottsboro case; representative stories or novels by Dorothy Parker, Dos Passos, Farrell, Faulkner, Steinbeck, and Wright; the federal arts and writers projects; and the controversies over the social responsibilities of writers.

470 Studies in the Novel: Conrad, Lawrence, and Joyce Spring. 4 credits. Limited to 15 students. Perequisite: permission of instructor.
T R 12:20–1:35. D. R. Schwarz.
A critical study of major fiction of Conrad, Lawrence, and Joyce. Readings will focus on Conrad and Joyce, but will include one major novel by Lawrence. Works will include *Lord Jim*, *The Secret Agent*, *Heart of Darkness*, *The Secret Sharer*, and *The Rainbow*. The last six weeks will be spent on *Ulysses*. An effort will be made to show how the innovations that each author brings to the novel form derive from the demands of his characteristic themes.

471 History into Fiction Fall. 4 credits. Open to nonmajors.
T R 10:10–11:25. H. Shaw.
What makes a historical novel "historical?" Answers to this question are sought by exploring works of historical fiction by such authors as Scott, Balzac, Thackeray, Dickens, and Tolstoy. Some attention is given to literary theory, the philosophy of history, and the various authors' historical sources, but the primary focus is on the works themselves. Our discussions should provide a fruitful meeting ground for people with different areas of interest and expertise; non-English majors are welcome.

475 Readings in the Humanities and Social Sciences Spring. 4 credits. A College Scholar seminar; up to 20 College Scholars receive priority in enrollment.
T R 10:10–11:25. N. Hertz.
A look at the diversity of ways in which human experience can be interpreted and presented in writing. During the first half of the term three accounts of the operations of the mind are considered — Descartes' *Meditations*, selections from Hume's *Treatise of Human Nature*, and Freud's *The Interpretation of Dreams*. In the second half the focus is on the 1848 Revolution in France, as it is represented in the works of some recent academic historians, in Tocqueville's *Memoirs*, in Marx's *The Eighteenth Brumaire of Louis Napoleon*, and in Flaubert's *Sentimental Education*.

477 Children's Literature Fall. 4 credits.
T R 2:30–3:45. A. Lurie.
A survey of classic English and American works for children from 1850 to the present. Special topic for 1979: Folklore and fiction. Among the readings are Jacobs, *English Fairy Tales;* Carroll, *Alice in Wonderland;* Kipling, *The Jungle Books;* Stevenson, *Treasure Island;* Nesbit, *The Five Children and It;* Baum, *The Wizard of Oz;* Barrie, *Peter Pan;* Grahame, *The Wind in the Willows;* Tolkien, *The Hobbit;* and L'Engle, *A Wrinkle in Time*.

479 Reading Woman Poets (also Women's Studies 479) Spring. 4 credits.
M W F 1:25. S. Siegel.
The autobiographical, critical, and poetic writings of Amy Lowell, Hilda Doolittle, Marianne Moore, Sylvia Plath, and Adrienne Rich are studied in detail. The salient departures from conventional poetic modes and themes and the pressures each poet has felt to be significant in her attempt to shape herself, her esthetic, and her poetry are considered.

480–481 Seminar In Writing 480, fall; 481, spring. 4 credits. Prerequisites: English 382–383 or 384–385, and permission of instructor. Limited to 15 students.
T 12:20–2:15. Fall, A. Lurie; spring, J. McConkey.
Intended for those writers who have already gained a basic mastery of technique. Students normally enroll for both terms and should be capable of a major project — a collection of stories or poems, a group of personal essays, or perhaps a novel — to be completed by the end of the second semester. Seminars are used for discussions of the students' manuscripts and published works that individual members have found of exceptional value.

491 Honors Seminar I: Johnson as Critic and Critics of Johnson Fall. 4 credits.
T R 12:20–1:35. N. Hertz.
An examination of some of the kinds of writing — critical, biographical, historical, theoretical — that have accumulated around works of literature. What sorts of things are people led to say about books? What determines the choice of one approach rather than another? The focus is on the writings of a major critic, Samuel Johnson, and the variety of commentary his own work has elicited during the last two hundred years.

492 Honors Seminar II: The Demands of the Novel Spring. 4 credits.
T R 2:30–3:45. E. Rosenberg.
Three major novels, *Little Dorrit*, *Anna Karenina*, and *The Magic Mountain*, are studied from a variety of critical and theoretical perspectives (sociological, ontological, intentionalist, genre study). Source readings in mythology, contemporary documents, nineteenth-century philosophy, and novel theory. Ancillary study of pertinent short fiction, autobiographical matter, and criticism by the three novelists.

493 Honors Essay Tutorial I Fall or spring. 4 credits. Prerequisite: senior standing and permission of the chairperson of the honors committee.
Staff.

494 Honors Essay Tutorial II Fall or spring. 4 credits. Prerequisite: English 493 and permission of the chairperson of the honors committee.
Staff.

495 Independent Study Fall or spring. 2–4 credits. After consulting their major adviser, students should apply to the director of undergraduate studies for permission to take independent study. Permission will be granted only to students who present an acceptable prospectus and who have secured the agreement of a faculty member to serve as supervisor for the project throughout the term.

496 Teaching and Research Fall or spring. 1–2 credits. May not be used in satisfaction of the English major.
Staff.
For students who, with the consent of a professor, assist in the teaching of that professor's course.

Teacher Preparation Courses

570 The Teaching of English Fall or spring. 4 credits. To be taken the semester prior to student teaching.
Hours to be arranged.
The planning and design of instruction in literature, writing, language, and communication skills for secondary school students.

571 Seminar in the Teaching of English Fall or spring. 3 credits. To be taken concurrently with English 578 or 579.
Hours to be arranged.
Focus is on the practical considerations of teaching in general, and practice teaching in particular. There are career-related lectures by librarians, specialists in reading, and scholars in both English and education.

575 Directed Study: Problems in Teaching English Language and Literature Fall or spring. 4 credits.
Hours to be arranged.
Specific problems in the teaching of English on the secondary school level are dealt with. Practical classroom work at the high school or junior high school level is combined with background readings and research.

576 Practicum In Secondary School Teaching Fall or spring. 2 credits. Open to sophomores, juniors, seniors, and graduate students. Usually taken concurrently with English 570.
Hours to be arranged.
A variety of projects may be arranged under this rubric. Students work under the supervision of local school personnel. They may work as reading tutors (5 hours per week), or in 3-week mini-courses, in which they observe for one week and teach for two. Several different projects can be taken with this course number, during the same or different semesters.

578 Undergraduate Student Teaching Fall or spring. 6 credits. Prerequisites: admission to the department's undergraduate teacher preparation program, English 570, and an elected tutoring experience.
Hours to be arranged.
Seniors spend one semester in a local secondary school, gradually assuming the responsibilities of a full-time English teacher. This is a competency-based course leading to provisional certification in New York State.

579 Graduate-Level Student Teaching Fall or spring. 6 credits.
Hours to be arranged.
Similar to English 578, this course is for M.A.T. candidates who seek certification in English for New York State. It entails a full semester of student teaching under an experienced master teacher. The student is at a local school full-time.

Courses Primarily for Graduate Students

Permission of the instructor is a prerequisite for admission to courses numbered in the 600s. These are primarily intended for graduate students, although qualified undergraduates are not excluded. Undergraduates seeking admission to a 600-level course should consult the appropriate instructor. The list of courses given below is illustrative only; a definitive list, together with course descriptions and class-meeting times, will be published in a separate department brochure before course enrollment each term.

607 Theory and Practice of Translation Fall. 4 credits.
E. G. Fogel.

611 Readings in Old English Fall. 4 credits.
R. T. Farrell.

612 *Beowulf* Spring. 4 credits.
T. D. Hill.

614 The Middle English Lyric Spring. 4 credits.
T. D. Hill.

615 The English Language Spring. 4 credits.
R. T. Farrell.

619 Chaucer Spring. 4 credits.
R. E. Kaske.

620 Piers Plowman Fall. 4 credits.
R. E. Kaske.

622 Reading in the English Renaissance Spring. 4 credits.
B. Rosecrance.

624 Lyric Sequences Fall. 4 credits.
C. Levy.

628 Renaissance Tragedy Spring. 4 credits.
B. B. Adams.

641 Coleridge and Shelley Fall. 4 credits.
R. Parker.

642 *The Prelude* and Related Works Spring. 4 credits.
M. H. Abrams.

645 Nineteenth-Century Prose Fall. 4 credits.
P. L. Sawyer.

647 The Victorian Novel: Brontë and Thackeray Spring. 4 credits.
J. F. Blackall.

654 The 1920s: Joyce, Eliot, Woolf, and Yeats Spring. 4 credits.
P. L. Marcus.

661 Puritanism and American Literature Fall. 4 credits.
M. J. Colacurcio.

663 Realism and Naturalism Spring. 4 credits.
R. H. Elias.

664 Modern American Poetry: Stevens, Williams, Eliot, and Others Spring. 4 credits.
E. G. Fogel.

665 Hawthorne and James Fall. 4 credits.
D. E. McCall.

670 The Evolution of the Novel Fall. 4 credits.
D. R. Schwarz.

672 Studies in Dramatic Literature: O'Neill Fall. 4 credits.
A. Caputi.

673 Studies in Dramatic Literature Spring. 4 credits.

691 American History and the Literary Imagination Fall. 4 credits.
S. C. Strout.

692 Freud and Literature Spring. 4 credits.
N. H. Hertz.

Graduate Seminars

Permission of the instructor is a prerequisite for admission to any course numbered in the 700s. Most of these courses may be limited in enrollment at the discretion of the instructor. For course descriptions see the department brochure.

710 Bibliography and Methodology for the Interpretation of Medieval Literature Spring. 5 credits.
R. E. Kaske.

723 Donne Fall. 5 credits.
D. Novarr.

729 Milton Spring. 5 credits.
C. S. Levy.

742 Wordsworth Fall. 5 credits.
S. M. Parrish.

746 Tennyson and Browning Spring. 5 credits.
D. Mermin.

758 Yeats Fall. 5 credits.
J. Stallworthy.

762 Melville Spring. 5 credits.
M. J. Colacurcio.

764 Faulkner Fall. 5 credits.
W. J. Slatoff.

780 Creative Writing Fall. 5 credits.
J. Stallworthy.

781.1 Creative Writing: Poetry Spring. 5 credits.
R. Morgan.

781.2 Creative Writing: Fiction Spring. 5 credits.
W. J. Slatoff.

793 Master's Essay Fall or spring. Noncredit.
Staff.

794 Directed Study Fall or spring. 5 credits.
Staff.

795 Group Study Fall or spring. 5 credits.
Staff.

796 Teaching and Research Fall or spring. 5 credits.
Staff.

Related Courses in Other Departments

In addition to courses offered by the Departments of Comparative Literature and Women's Studies and the Africana Studies and Research Center, the following courses will be of particular interest to English majors and graduate students in English.

Courses in Classical and Ancient Literature

Greek Mythology (Classics 236)

Ancient Epic (Classics 238)

Word Power (Classics 100)

Readings in the New Testament (Comparative LIterature 429)

Courses in Dramatic Literature

Seminar in Dramatic Theory (Theatre Arts 637)

Literature and the Theater (Theatre Arts 730)

Greek and Roman Drama (Classics 300)

Comedy (Comparative Literature 312)

Classic to Renaissance Drama (Comparative Literature 352)

World Drama: 1660–1900 (Comparative Literature 353)

Modern Drama (Comparative LIterature 354)

Courses Offered by the Society for the Humanities

Aesthetics and Ideology of Realism (Society for the Humanities 429)

Contemporary Criticism and the Concept of Language (Society for the Humanities 430)

Geological Sciences

The Department of Geological Sciences is an intercollege department of the College of Arts and Sciences and the College of Engineering. Courses offered by the department are listed under "College of Engineering."

German Literature

See page 91.

Government

Introductory Courses

111 The Government of the United States Spring. 3 credits.
T. J. Lowi.
An introduction to government through the American experience. Concentration on analysis of the institutions of government and politics as mechanisms of social control.

131 Introduction to Comparative Government and Politics Spring. 3 credits.
M. J. Esman.
A survey of the institutions, processes, and major problems of politics and government in contemporary states. The structures and ideologies of different regimes, the relationships of individuals and groups to the state, the shaping and implementation of public policy, the regulation of political conflict, and the adaptation of political systems to changing conditions.

161 Introduction to Political Theory Fall. 3 credits.
W. J. Dannhauser.
A survey of the development of Western political theory from Plato to the present. Readings from the work of the major theorists; an examination of the relevance of their ideas to contemporary politics.

181 Introduction to International Relations Fall. 3 credits.
R. Rosecrance.
An introduction to the basic concepts and practice of international politics.

Freshman Seminars

100 Freshman Seminars Fall or spring. 3 credits.
Seminars will be offered in both the fall and spring terms. Consult the supplement issued by the department and the Freshman Seminar booklet for course descriptions and instructors.

Major Seminars

300 Major Seminars Fall or spring. 4 credits.
Consult the supplement issued by the department for course descriptions and instructors. Admission by application only. Forms are provided each term for students to indicate their seminar preferences and are available in 125 McGraw Hall. Nonmajors may be admitted upon application but government majors are given priority. Majors are encouraged to take at least one seminar course during the junior or senior year.

The following courses are open to sophomores, juniors, and seniors without prerequisites unless otherwise indicated.

American Government and Institutions

Government 111 is recommended.

Students may register and receive credit for 302 both in the fall and spring.

302 Energy and American Politics Fall. 4 credits.
D. Lapin.
An examination of various dimensions of the energy issue as a public policy topic. We will be especially concerned with the federal government's recent attempts to define a successful national energy policy. We will try to appraise these attempts and account for their extremely limited success. In so doing, we hope to gain some critical perspectives on the interplay between government and private enterprise in the making of public policy in the United States.

302 The Impact and Control of Technological Change (also Economics 302 and CRP 440) Spring. 4 credits.
R. Brickman, S. Jasanoff.
The role of technology as a factor in social, economic, and political change is examined. Issues, institutions, and mechanisms in the control of technology, particularly environmental regulation, are discussed.

303 American Democracy and the Limits to Growth Fall. 4 credits.
D. Lapin.
This seminar focuses upon the implications of recent progrowth and antigrowth arguments for American democracy. Much of our time is devoted to the examination of several growth-related policy issues, e.g., energy, population, food, technology. However, our main task is to explore this issue: does the American political system presuppose, or require, economic growth? In light of the various limits to growth, which we must come to terms with in this course, this last question must be of fundamental concern for contemporary analyses of American politics.

310 Power and Poverty in America Spring. 4 credits.
R. King.
This course examines economic, racial, and sexual configurations of wealth and poverty in the United States. It also deals with public policy and public protest in these areas.

[311 Urban Politics 4 credits. Not offered 1979–80.]

312 Urban Affairs Laboratory Fall or spring (if 40 students register). 4 credits. Open to both undergraduate and graduate students. Fee for course materials, $15.
D. E. Van Houweling and P. Vaughan.
An interdisciplinary course in urban affairs which emphasizes learning by experience in an urban game rather than lectures or reading assignments. By playing roles in a simulated city, students test their solutions for environmental and other urban problems. The roles include city councilperson, city manager, environmental quality agency director, newspaper editor, industrialist, community organizer, land speculator, and planner.

313 The Nature, Functions, and Limits of Law Spring. 4 credits.
K. L. Hanslowe.
A general education course for students at the sophomore and higher levels. Law is presented not as a body of rules, but as a set of varied techniques for resolving conflicts and dealing with social problems. The roles of courts, legislatures, and administrative agencies in the legal process is analyzed, considering also the constitutional limits on their power and practical limits on their effectiveness. Readings consist mainly of judicial and administrative decisions, statutes and rules, and commentaries on the legal process.

[314 Common Law and Lawyers in America 4 credits. Not offered 1979–80.]

316 The American Presidency Spring. 4 credits.
A. T. Dotson.
Analysis of the politics of the presidency and the executive branch with emphasis on executive-legislative relations, executive branch policymaking, and the problems of the modern presidency.

[317 Political Parties and Elections 4 credits. Not offered 1979–80.]

318 The American Congress Spring. 4 credits.
D. Lapin.
The role of Congress in the American political system. Topics to be discussed: the political setting within which Congress operates, the structure of Congress, the salient features of the legislative process, and recent congressional behavior in a number of policy areas.

319 American Political Behavior Fall. 4 credits.
P. G. Leeds.
Examines those factors (political, social, economic, and psychological) that affect the formation, development, and organization of political opinions and attitudes and the impact of these political attitudes on an individual's political behavior. The main focus concerns the interplay between normative requirements for participation in a democratic society and the actual empirical investigation of the existing quality and level of participation in the United States.

321 Public Policy and Public Revenues Fall. 4 credits.
R. King.
Money is, in a sense, the lifeblood of government and the politics of federal taxing and spending is essential to the allocation of more than one-fifth of the national product. This course attempts to examine the general patterns of budgetary outcomes in America, their distributional consequences, and the institutional processes by which they are determined. Particular attention is given to the role of popular representatives, especially the members of Congress, in fiscal decision-making.

323 The "Fourth" Branch Spring. 4 credits.
A. T. Dotson.
The national administrative branch is examined. Particular attention is given to the constitutional and political problems that result from the rise of administrative power.

327 Civil Liberties in the United States Spring. 4 credits.
D. Jensen.
An analysis of contemporary issues in civil liberties and civil rights, with emphasis on Supreme Court decisions. Cases are analyzed in terms of democratic theory and the social and political context in which they arose.

328 Constitutional Politics: The United States Supreme Court Fall. 4 credits.
D. Jensen.
The course investigates the role of the Supreme Court in American politics and government. It traces the historical development of constitutional doctrine and the institutional role the court has played in American politics.

[411 Political and Economic Power in Cities 4 credits. Not offered 1979–80.]

426 Science, Technology, and Public Policy (also B&PA NPA 504) Spring. 4 credits.
R. Brickman.
The major trends, issues, and implications of public policies supporting research and technological innovation are reviewed. General problems such as the organization of science policymaking in government and the impact of policies on university and industrial research and development are covered. Specific sectors of research and development policy to be discussed include military research, energy research, and science and technology in international affairs.

428–429 Government and Public Policy: An Introduction to Analysis and Criticism 428, fall; 429, spring. 4 credits each term. Open to undergraduates with permission of instructor.
T. J. Lowi.
The analysis and criticism of public policies and the governments and politics responsible for them is stressed in Government 428. 429 is a weekly workshop for a smaller group, concentrating on problems for research, writing, and publication.

Comparative Government

Government 131 is recommended.

332 Politics and Society in France and Italy Spring. 4 credits.
S. G. Tarrow.
A comparative treatment of the political traditions, governmental institutions, and policy problems of two countries with deep social cleavages, vigorous multiparty systems, and special connections to the United States. Special attention is given to problems of economic planning and social policy, the role of the communist party in each country, and the place of Italy and France in Europe.

333 Government and Politics of the Soviet Union Fall. 4 credits.
M. Rush.
A focus on the politics of the top leaders, the institutions through which they operate, and the impact of their policies on the Soviet people. Emphasis is also on phases in the development of

the Soviet system and on the ways in which the Soviet Union served as the prototype for all subsequent Communist states, as well as on the variant forms that have appeared in other states.

334 Business and Labor in Politics Fall. 4 credits.
T. J. Pempel.
Historically business and labor have been critical elements in shaping the specific politics of most advanced industrial democracies. Land grants to U.S. railroad magnates, the rotten boroughs in English elections, unionization and class consciousness in continental Europe, the development of social welfare programs, and colonization and imperialism are but a few of the foremost examples. Today such interactions are similarly crucial in such diverse areas as the rise of multinational corporations, immigrant labor, strikes by public-sector employees, racial and class exclusionism in unions, environmental pollution, consumer protection, and electoral financing. The historical and contemporary roles of business and labor in such areas are examined in different industrialized democracies.

335 Cuba: Culture and Revolution Fall. 4 credits.
E. G. Kenworthy and E. Santi.
The arts in Cuba are studied as reflections of the conflicts and changes wrought by the 1959 revolution. The emphasis is on prose narrative but does not exclude theater and film. Topics include the role of the artist in social change; the government's cultural policy; intellectual freedom; Socialist Realism and its alternatives. Readings in history and politics will supplement the literature read in translation.

340 Latin American Politics Spring. 4 credits.
E. G. Kenworthy.
An introduction to the national politics of the larger Latin American nations, focusing on the post-1964 era. Explanations for the dominant pattern of authoritarian rule will be sought, and alternatives to this pattern explored.

341 Society and Politics in Central Europe Fall. 4 credits.
P. Katzenstein.
The political, social, economic, and cultural differences and similarities of the Federal Republic, the GDR, and Austria since 1945 are analyzed. Focus is on the consequences of the fragmentation of a unified Germany.

[342 Government and Politics of Canada 4 credits. Not offered 1979–80.]

344 Government and Politics of Southeast Asia Spring. 4 credits.
B. R. O'G. Anderson.
The organization and functioning of the political systems of Southeast Asia is analyzed, with special attention to the problems of postcolonial social and political development.

[346 Politics in Contemporary Japan 4 credits. Not offered 1979–80.]

[347 Chinese Government and Politics 4 credits. Not offered 1979–80.]

348 Politics of Industrial Societies Fall. 4 credits.
T. J. Pempel.
An examination of tensions between the promise of responsible and responsive governments, and the reality of bureaucratic and technological growth. The major industrial democracies of Western Europe, North America, and Japan are examined and internal and international inequities in distributions of wealth are discussed.

349 Political Role of the Military Fall. 4 credits.
B. R. O'G. Anderson.
Comparative study of selected modern states and types of political systems in which the military have played a major role in domestic politics. Attention is given to the social and ideological character of the politicized military and various forms of military government.

[350 Comparative Revolutions 4 credits. Not offered 1979–80.]

353 Women and Politics (also Women's Studies 353) Spring. 4 credits.
M. Katzenstein.
Alternative visions of the roles that women should play in society; the strategies that women have used to assert their claims to equality; and the results of different governmental policies on the status of women in liberal democratic and in revolutionary societies are considered.

356 Elites and Society: The Political Economy of Power Spring. 4 credits.
N. T. Uphoff.
The nature and uses of power in politics: How power has been treated by earlier political thinkers and by contemporary social scientists is considered. Propositions about the distribution and consequences of power in America, other industrialized societies, and in the Third World are formulated and critiqued and their implications for the making of public policy are examined. A simulation game, "Third World Power Play," takes place at the end of the semester.

[357 Political Development in Western Europe 4 credits. Not offered 1979–80.]

[358 Politics of the Middle East 4 credits. Not offered 1979–80.]

[435 Politics of Decentralization and Local Reform 4 credits. Not offered 1979–80.]

446 Comparative Communism Spring. 4 credits. M. Rush.
This seminar deals with regimes that claim to be committed to the Marxist-Leninist program for the realization of socialism and communism. Similarities and differences among countries of the Soviet bloc, China, and Yugoslavia are investigated.

[456–457 Policymaking in Industrial Societies 4 credits. Not offered 1979–80.]

[459 Politics in Contemporary Europe: The Politics of the Left 4 credits. Not offered 1979–80.]

Political Theory

Government 161 is recommended.

[361 Modern Ideologies: Liberalism and Its Critics 4 credits. Not offered 1979–80.]

[363 Classics in Political Thought 4 credits. Not offered 1979–80.]

364 Liberty, Equality, and the Social Order Fall. 4 credits.
D. Meyers.
We consider the accounts of liberty and equality provided by several major political philosophers, including Hobbes, Locke, Rousseau, and Mill; and we examine their proposals for embodying these concepts in political institutions.

[367 The Logic of Liberalism 4 credits. Not offered 1979–80.]

368 Economic Models of Politics Fall. 4 credits.
E. W. Kelley.
Economic factors influencing the structure of political systems and economic models of such systems are considered. The rationalistic presumptions underlying some such models are introduced and modified. Applications to enduring policy arenas may be made.

[373 Feminist Political Thought 4 credits. Not offered 1979–80.]

[375 American Political Thought 4 credits. Not offered 1979–80.]

376 Marx Fall. 4 credits.
S. Buck-Morss.
Readings in Marx's philosophical, economic, and political writings. Analysis of Marxism as a way of thinking: basic concepts and epistemological structures of his theory, within the context of nineteenth-century historical events. Lectures draw on twentieth-century interpretations as an introduction to the historiography of Marxism and its controversies, to the politics of scholarship, and to the creative process involved in the historical reproduction of an idea.

379 Freud Spring. 4 credits.
S. Buck-Morss.
Analysis of Freud's own writings on psychological and social theory, clinical practice, and analytic method. Consideration of the political implications of these texts and their philosophical contribution. Critical discussion of post-Freudian revisions of the theory, including Left Freudianism, ego-psychology, and radical feminism.

International Relations

Government 181 is recommended.

382 Integration in the World System Fall. 4 credits.
S. Jackson.
This seminar explores theories of interdependence, regional integration, and dependency as particular applications of the generalized concept of integration in the world system.

[383 Theories of International Relations 4 credits. Not offered 1979–80.]

385 Contemporary American Foreign Policy Fall. 4 credits.
G. H. Quester.
An analysis of the dilemmas that have confronted American foreign policy since 1945, both specific problems and more general questions of capabilities, priorities, and morality.

386 Economic Issues in International Relations Spring. 4 credits.
S. Jackson.
This course investigates the international relations of nations from an economic perspective. Its primary focus is on North-South relations. It looks at these in terms of the impact of multinational corporations and the theories of neocolonialism and dependency.

387 The United States and Asia Spring. 4 credits.
G. McT. Kahin.
The relations of the United States with the major states of Asia and with those smaller countries (especially Vietnam) with which it has been particularly concerned are analyzed. Attention is also given to the relationship of American policy to the Asian policies of France, Great Britain, and Soviet Russia.

[389 International Law 4 credits. Not offered 1979–80.]

390 The Foreign Policy of China Spring. 4 credits.
D. P. Mozingo.
An analysis of Chinese concepts of foreign relations and the policymaking process in the People's Republic of China. Emphasis is on such topics as the contemporary Chinese view of their position in the international community and a comparison of the making and implementation of contemporary Chinese policies with respect to such areas as the Soviet bloc, Afro-Asian countries, and the West.

[480 Foreign Economic Policies of Advanced Industrial Societies 4 credits. Not offered 1979–80.]

481 Foreign Policy of the U.S.S.R. Spring. 4 credits.
M. Rush.
An analysis of Soviet foreign policy, as it developed out of the revolution and accommodated to the prevailing international system, with a focus on the period since 1945. Particular topics include causes and prospects of the cold war, impact of nuclear weapons on Soviet defense and foreign policy, and sources and goals of Soviet hegemony in East Europe, causes of the dispute with China, and impact of domestic politics on the formation of foreign policy.

482 Imperialism and Dependency Spring. 4 credits.
E. G. Kenworthy.
A critical reading of several conceptions of imperialism is followed by an analysis of the phenomenon in selected cases.

483 Political and Economic Interdependence Fall. 4 credits.
R. Rosecrance.
The political and economic interdependence among nations, both historical and contemporary, is studied. The international systems of mercantilism, nineteenth-century *laissez-faire*, and economic nationalism of the 1930s are reviewed briefly. Emphasis is on contemporary situations and data.

484 Defense Policy and Arms Control Spring. 4 credits.
G. H. Quester and guest lecturers from participants in the Cornell Peace Studies Program.
The requirements for military defense and the problems caused by it are analyzed. Subjects covered include nuclear deterrence reasoning, military strategy, approaches to disarmament, the working of military-industrial complexes, and defense budgeting and policy procedures.

485 Logic and Methods of Research in International Relations Fall. 4 credits.
S. Jackson.
This course explores the logic and method of the various approaches to research in international relations.

486 International Strategy Spring. 4 credits.
R. Rosecrance.
Doctrines of deterrence and defense, particularly upon their interaction in American policy since 1945, are focused on. The relationship between doctrine and the type of international system (bipolar or multipolar) is considered and other means of equilibration in the international system are investigated.

490 International Politics of Energy Fall. 4 credits.
L. Scheinman.
The political, economic, and technical dimensions of international energy problems with principal emphasis on alternatives to an oil-based economy, and in particular nuclear energy. Dynamics of supplier cooperation, national energy policymaking, and corporate behavior are evaluated as are the potential ability of technological changes to transform the nature of the problem. Attention is given to the impact of the energy situation on the course of world order and the structure of international politics.

Political Methodology

[391 Human and Social Statistics 4 credits. Not offered 1979–80.]

Honors Courses

400 Honors Seminar: Research on the European Left Fall. 4 credits. Limited to honors students.
S. G. Tarrow.

494 Honors Thesis Fall or spring. 8 credits.
In their senior year, honors students will be required to take Government 494, in which they will prepare and write an honors thesis — an extended piece of original independent research. Before the end of the semester that precedes the semester in which the thesis is to be written, each participant must submit an approved proposal to the department office. Proposal forms may be obtained from the undergraduate secretary in 125 McGraw Hall. Honors theses are given to a second reader for evaluation and students are examined orally on their work by the two faculty members involved. In cases where students feel the need for a period of preparatory work before undertaking an honors thesis, they may make use of the option available under Government 499.

Supervised Study

Except under very unusual circumstances supervised study, Government 499, is open only to government majors doing superior work in the major. There is no limit established for the total number of credits in 499 a government major may take while at Cornell, but he or she may count no more than 4 credits toward fulfillment of the major. Students who wish to continue taking Government 499 for more than one semester must select a new theme or subject each semester, and applicants must present a well-defined program of study that cannot be satisifed by taking regular courses. Credit can be given only for work which results in a satisfactory amount of writing. Emphasis is on the capacity to subject a body of related readings to analysis and criticism. The consent of the instructor is required.

499 Readings Fall or spring. 1–4 credits.
Staff.

Graduate Seminars

Qualified undergraduates are encouraged to apply for seminars listed with 600 course numbers. Consult the supplement which lists graduate courses, available in the department office.

Field Seminars

601 Scope and Method of Political Analysis Fall. 4 credits.
P. G. Leeds, P. Katzenstein.
This seminar offers an overview of the main problem areas and theoretical orientations in the four subfields of contemporary political analysis: political theory, American politics, comparative politics, and international relations. Selected topics, including questions of research design, are treated through a reading of the best contemporary literature. The broad issues of the philosophy of social science or specific techniques of analysis may also be addressed.

602 Field Seminar in Methodology Spring. 4 credits.
E. W. Kelley.
Some attention is given to general problems of research design and hypothesis formulation. Emphasis is on measurements and hypothesis testing. Topics to be covered include statistics, both parametric and nonparametric; unidimensional and multidimensional scaling; data theory; and causal modeling.

603 Field Seminar in American Politics Fall. 4 credits.
P. Leeds.
The basic issues and institutions of American government and the various subfields of American politics are introduced. The focus is on substantive information and theoretical analysis and problems of teaching and research.

604 Field Seminar in Public Policy Spring. 4 credits.
E. W. Kelley.
An introduction to the study of public policy. Various analytical approaches will be presented: models of public choice and political economy; analysis of bureaucratic politics, executive and political leadership, and interest groups and public opinion; economic analysis of public finance and welfare economics; and organization theory, game theory, and decision theory as these relate to the analysis of public policy formation and applications.

605 Field Seminar in Comparative Politics Spring. 4 credits.
S. G. Tarrow.
An introduction to selected theoretical problems in the study of comparative politics and to their application in empirical analysis. Basic problems are social class and politics; authority and legitimacy; participation and mobilization; economic development and democracy; authoritarian and totalitarian politics; corporatism and pluralism; nation building and political integration.

606 Field Seminar in International Relations Spring. 4 credits.
R. Rosecrance.
A general survey of the literature and propositions of the international relations field. Criteria are developed for judging theoretical propositions and are applied to the major findings. Participants will be expected to do extensive reading in the literature as well as research.

607 Field Seminar in Political Thought Fall. 4 credits.
W. J. Dannhauser.
An introduction to political theory through a reading of selected classics in political thought from Plato to Marx.

American Government and Institutions

[618 American Political Behavior 4 credits. Not offered 1979–80.]

[621 Elections and Public Policy 4 credits. Not offered 1979–80.]

623 Capitalism, the State, and the Economy Spring. 4 credits.
R. King.
This seminar investigates the relationships between political institutions and economic life in contemporary America.

Public Policy

628 Politics of Technical Decisions I (also B&PA NPA 515 and CRP 541) Fall. 4 credits.
S. Del Sesto, D. Nelkin.

629 Politics of Technical Decisions II (also B&PA NPA 516 and CRP 542) Spring. 4 credits.
D. Nelkin.
The political aspects of public policy decisions are traditionally regarded as technical problems. Exploration of the concept of technical decisions and the characteristics of a technological society, with discussion of how decisions are determined or limited by the technologies involved, the institutions of technical decision making, the sources and implications of depoliticization, and the rise of citizen opposition to technological development.

Comparative Government

642 The Politics of Communalism Fall. 4 credits.
M. J. Esman.
Investigation of the politics of racial, ethnic, religious, linguistic, and cultural pluralism. Emphasis is on subnational pluralism, the implications of communal cleavages for political and economic development, and strategies for the managements of various expressions of communal conflict. Relationships between modernization and communal pluralism are focused on, and the manifestation of these phenomena in contemporary United States experience is considered.

[645 Politics of China 4 credits. Not offered 1979–80.]

647 Political Anthropology: Culture and Revolution in Indonesia (also Anthropology 628) Spring. 4 credits. Prerequisite: reading knowledge of Indonesian.
B. R. O'G. Anderson, J. T. Siegel.
The relationship of politics to culture is studied through the works of such authors as Ivan Simatupang, Pramoedya Ananta Toer, and Armijn Pané.

648 Political Economy of Change: Rural Development in the Third World Fall. 4 credits.
N. T. Uphoff.
The substantive focus is on economic, social, and political change in Third World countries, particularly with reference to rural development. The analytical approach integrates economic, social, and political factors into a common framework for dealing with policy choices and political action. Special attention is given to different instruments for promoting rural development in Third World countries.

652 Political Problems of Southeast Asia Fall. 4 credits.
G. McT. Kahin.
Focus is on the genesis and development of political forces in South Vietnam since World War II and on the establishment and shaping of the Saigon regime, 1954 to 1975.

[655 Latin American Society and Politics
4 credits. Not offered 1979–80.]

659 Political Transitions in Western Europe Fall. 4 credits. Prerequisite for undergraduates: permission of instructor.
S. G. Tarrow.
How do countries get from one stage of political development to another? How do autocratic countries develop into democratic ones? Under what conditions is progress toward representative government reversed? In what situations are transitions violent and in what circumstances do they take place with no essential break in political tradition? The course considers (1) theories which help to explain political transitions; (2) nineteenth-century cases that either support or question existing theory; and (3) twentieth-century cases of either authoritarian or democratic transition.

Political Theory

667 Philosphical Foundations of Contemporary Politics: Rawls and Nozick Spring. 4 credits.
D. Meyers.
This seminar investigates the philosophical writings of John Rawls and Robert Nozick. Efforts are made to relate them to the traditions of political thought, and their relevance for contemporary politics is discussed.

[668 Foundations of English Liberalism
4 credits. Not offered 1979–80.]

669 Modern Social Theory I Fall. 4 credits.
S. Buck-Morss.
What holds societies together? How do shared belief systems function as social cement? How do major modern theorists conceptualize the relationship between consciousness and society, and what are the political implications of their concepts? Readings from the work of Marx, Weber, Simmel, Tönnies; Nietzsche, Freud, Gramsci, Mannheim, Mosca, Adorno, Horkheimer, and Habermas.

670 Modern Social Theory II Spring. 4 credits.
S. Buck-Morss.
Theories that map out as structures the points where personal and social history intersect (in language, cognition, institutions), and developmental theories that deal with temporal transformations of such structures. Readings from the works of Durkheim, Mauss, Sassure, Lévi-Strauss, Althusser, Piaget, Benjamin, Foucault, Aires, Lacan, Berthes, Derrida.

673 Economic Models of Politics Fall. 4 credits.
E. W. Kelley.
Both economic factors influencing the structures of political systems and economic models of such systems are considered. The rationalistic presumptions underlying such models are introduced and modified. Applications to enduring policy arenas may be made.

[679 Early Modern Political Thought 4 credits. Not offered 1979–80.]

International Relations

687 The U.S. and Southeast Asia Spring. 4 credits.
G. McT. Kahin.
American Southeast Asian policies: their genesis, character, impact, and long-term consequences. Elements involved in the formation of American policies toward Southeast Asia by the several postwar administrations (Truman through Carter) including international factors and American domestic politics. The ways in which these policies have been applied and their influence on political forces within the countries of Southeast Asia and upon American policies towards other countries.

[691 Problems of Soviet Politics 4 credits. Not offered 1979–80.]

692 The Administration of Agricultural and Rural Development Spring. 4 credits.
M. Esman and others.
The political, bureaucratic, economic, and technical environments of administration for agricultural and rural development; the various functions involved in administration (personnel management, planning, budgeting, economic analysis, information systems); several major tasks (research, extension, services, and infrastructure development); and specific problems of integrating activities, interfacing with rural populations, and utilizing external assistance. Intended primarily for persons who expect to have some future responsibilities in agricultural or rural development administration in Third World countries.

History

Underclass Seminars

151–152 Introduction to Western Civilization
151, fall; 152, spring. 4 credits each term. History 151 is not a prerequisite to 152. Either term or both may be used to fulfill the Freshman Seminar requirement.
Fall: T R 9:05, plus discussion to be arranged; spring: T R 9:05, plus discussion to be arranged.
L. P. Williams.
A survey of European history, History 151 covers antiquity to the Reformation; 152 spans the sixteenth century to the present day. The major political and social developments and the intellectual heritage of the West are both studied. A considerable portion of the reading is drawn from contemporary sources.

205 The Growth of Political Democracy in the United States. Fall. 4 credits. May be used to fulfill the Freshman Seminar requirement.
T 2:30–4:25. J. H. Silbey.
The democratization of American political life since the American Revolution is examined. Such topics as the expansion of white, black, and women's suffrage and the changing concepts of participation and leadership in American politics are explored.

207 Freshman Seminar: The Family in American History Spring. 4 credits.
M 1:25–3:15. M. B. Norton.
An examination of the American family in the context of changing times from the seventeenth century to the present day. Readings include both primary and secondary sources. Students research the past experience of their own families as part of the course.

208 Freshman Seminar: Civil Liberties in the United States Spring. 4 credits. Prerequisite: permission of the instructor.
T R 2:30. R. Polenberg.
Freedom of speech and dissent from Jefferson's time to the present, with emphasis on the twentieth century. Topics include Jefferson and Burr; Lincoln and martial law; war and the Supreme Court; the ACLU and the New Deal; the relocation of Japanese-Americans; the Cold War and anticommunism; civil disobedience and censorship; John Milton, John Stuart Mill, and the critique of libertarianism.

212 The North Atlantic Community and the Wider World Fall. 4 credits. May be used to fulfill the Freshman Seminar requirement.
R 2:30–4:30. T. H. Holloway.
The relationship between the attitudes and values of Europeans and the emergence of the global economic and political network since the Age of Discovery. The voyages of exploration, commercial expansion, and the consolidation and dissolution of modern empires are considered. Texts contemporaneous with these periods will be read and discussed to explore ways members of the North Atlantic community have explained and justified their emerging world influence in religious, racial, technological, and cultural terms.

[214 American Foreign Policy Today and the Uses of History Fall. W. LaFeber. Not offered in 1979–80; next offered 1980–81.]

[232 Urban Problems and Policy in Historical Perspective Spring. S. Blumin. Not offered 1979–80; next offered 1980–81.]

[246 America in the Camera's Eye Spring. R. L. Moore. Not offered 1979–80; next offered 1980–81.]

250 English Constitutional History to 1600 Fall. 4 credits. Prerequisite: permission of instructor.
M W 9:05. F. G. Marcham.
A study of Anglo-Saxon law and government; Norman administrative and legal ideas as they relate to monarchy and feudalism; evolution of central government under Henry II; Magna Carta; the evolution of Parliament and the central court system. Examination of laws, charters, royal decrees, financial records, and parliamentary documents, all in translation. Reading and discussion focuses on original documents; occasional lectures supply political narrative.

255 English Constitutional History, 1600 to the Present Spring. 4 credits. Prerequisite: permission of instructor.
M W 9:05. F. G. Marcham.

A study of the Tudor monarchy; constitutional conflicts of the seventeenth century; the Glorious Revolution; evolution of cabinet government; general governmental reform of the nineteenth century; twentieth-century democracy, the welfare state, and a nationalized economy. Statutes, parliamentary debates, court decisions, and the reports of commissions are examined. Reading is in original documents; occasional lectures supply political narrative.

259 Public Life and Literature in Nineteenth-Century Great Britain Fall. 4 credits. Prerequisite: permission of instructor.
T R 9:05. F. G. Marcham.
British political, constitutional, economic, and imperial history are studied in the light of Victorian prose, poetry, and drama. History and literature are both considered; history through lectures and discussions of constitutional documents; literature through comment upon readings. Authors assigned include Macaulay, Carlyle, Tennyson, Mill, Darwin, Huxley, Gilbert and Sullivan, and Shaw.

260 Public Life and Literature in Twentieth-Century Great Britain Spring. 4 credits. Prerequisite: permission of instructor.
T R 9:05. F. G. Marcham.
A study of British political, social, and constitutional history is paralleled by the reading of plays. Both history and literature are considered. The development of parliamentary democracy in Great Britain, the consequences for her of the two world wars, the emergence of the welfare state, the application to the economy of nationalization, and Great Britain's withdrawal from imperialism are presented. Among the writers read and discussed are Shaw, Barrie, Maugham, O'Casey, Sherriff, and Eliot.

261 The Ancient City: Plato and Machiavelli Spring. 4 credits. May be used to fulfill the Freshman Seminar requirement.
T R 4:30–6. P. A. Rahe.
Close textual analysis and comparison of Plato's *Apology* and *Republic* and Machiavelli's *The Prince* and *Discourses* with an eye to the history of Greece and Rome.

271 Freshman Seminar: Revolution and Russian Society Fall. 4 credits.
M W 1:25–2:20. W. M. Pintner.
The state's attempts to maintain stability and the tension between the dissenting intelligentsia and the mass of the population are examined. Russia before and after the revolution of 1917 is discussed.

274 Foodways: A Social History of Food and Eating Fall. 4 credits. May be used to fulfill the Freshman Seminar requirement.
M 2:30–4:30. S. L. Kaplan.
An interdisciplinary examination of the validity of the adage "man is what he eats." Among the topics: food and nutrition; food and social structure; the politics of food control; food and modernization; taste making; and food in religion and literature. Illustrative examples are drawn from throughout history, from ancient Egypt to the present.

276 Britain and the Second World War Spring. 4 credits. May be used to fulfill the Freshman Seminar requirement.
R 2:30–4:30. D. A. Baugh.
The origins and aftermath of the war are examined, as well as the war itself, concentrating on Britain's role and experience between 1936 and 1948. The home front; war politics; logistics; the loss of imperial power; and the fighting on land, sea, and in the air are all considered.

[293 China and the European Psyche Spring. C. A. Peterson. Not offered 1979–80; next offered 1980–81.]

[294 Chinese Views of Themselves Spring. S. G. Cochran. Not offered 1979–80; next offered 1981–82.]

Comparative History

269 Historical Studies in the Origins of War Spring. 4 credits. No prerequisites. Open to freshmen.
M W F 11:15; plus an optional discussion, to be arranged. P. A. Rahe.
A comparative study of the causes of the Peloponnesian War, World War I, the Second Punic War, and World War II. The Cuban Missile Crisis is also discussed. Special attention is paid to the manner in which the decisions of statesmen are affected by geopolitics, military strategy, social organization, and party politics.

[360 Warfare in Premodern Societies Spring. 4 credits. C. A. Peterson. Not offered 1979–80.]

404 Anthropology and History (also Anthropology 414) Spring. 4 credits.
M W F 1:25. E. Fox, D. Greenwood, R. Smith.
Case studies of specific societies are used to test theories of social organization and action. The presentation of basic analytical concepts such as the geographic division of labor and interaction between communities, religions, and governments are covered, followed by the application of these concepts to historical examples.

[405 Population and History S. L. Kaplan. Not offered 1979–80.]

407 Death in Past Time Spring. 4 credits.
W 2:30–4:30. S. L. Kaplan.
Every culture has felt an urgent need to deal with death: to disarm, rationalize, and integrate it by giving it sense. How a culture perceives and propitiates death reveals a great deal about its social and political structure, religious and artistic values, and economic and scientific goals. The nature of death is considered, using a wide variety of examples drawn from throughout history.

408 Revolutions: England, America, France Fall. 4 credits. Prerequisite: a history course on the revolutionary period of at least one of the countries to be studied.
Hours to be arranged. C. Brooks.
Three early modern revolutions are compared. Is the search for a model of revolution worthwhile? How might such a search best be conducted? Revolutionary origins, ideology, and propaganda; regicide; loyalism and the revolutionary personality are studied, first in the context of one revolution and then comparatively.

449 Comparative Slave Systems in the Americas Fall. 4 credits.
T 2:30–4:25. T. H. Holloway, M. B. Norton.
The origins, development, and abolition of slavery in the Western Hemisphere are examined. Some consideration is given to divergent patterns of postabolition race relations. North America, the Caribbean, and Brazil are the regions compared.

History of Science

281–282 Science in Western Civilization 281, fall; 282, spring. 4 credits each term. History 281 is not a prerequisite to 282.
T R 2:30–4:25. L. P. Williams.
The development of scientific thought from antiquity to the present. Readings and discussions of original sources.

[284 Undergraduate Seminar in the History of Biology (also Biological Sciences 204 and College Scholar 284) Not offered 1979–80.]

[287 History of Biology (also Biological Sciences 201) W. Provine. Not offered 1979–80.]

288 History of Biology (also Biological Sciences 202) Spring. 3 credits. Prerequisite: one year of college biology. History 287 is not a prerequisite to 288.
T R 10:10–11:25. W. Provine.
For course description, see listing for Biological Sciences 202.

380 Social History of Western Technology Spring. 4 credits.
M W F 1:25. J. H. Weiss.
The interaction between technological changes and social changes in Western Europe and America since the eighteenth century is studied. Both instances of social transformation that accompanied technological changes and the role of technology in social thought and cultural expression are dealt with. Special attention is paid to three periods: Britain during the Industrial Revolution, America in the nineteenth century, and America during the Vietnam War.

[385 Problems in the History of Biology W. Provine. Not offered 1979–80.]

386 Problems in the History of Biology Spring. 4 credits. Enrollment limited to 25 students.
T 2:30–4:30. W. Provine.
Evolution and ethics. The impact of evolutionary ideas upon ethical theories from those of Charles Darwin to Edward O. Wilson are examined. Readings include selections from biologists, ethical philosophers, and theologians.

[481–482 Science in Classical Antiquity L. P. Williams. Not offered 1979–80.]

[680 Seminar in the History of Nineteenth-Century Physical Science L. P. Williams. Not offered 1979–80.]

American History

201 Introduction to American History: From the Beginning to 1865 Fall. 3 credits. No prerequisites.
M W F 11:15. F. Somkin.
A basic survey of problems and events.

202 Introduction to American History: From the Civil War to Recent Times Spring. 3 credits. No prerequisites.
T R 10:10–11:30. S. Blumin and staff.
Lectures survey specific topics in American history; emphasis is on reading and discussion.

311–312 Structure of American Political History 311, fall; 312, spring. 4 credits each term. History 311 is not a prerequisite to 312. Offered in alternate years.
Lec T R 10:10; discussion to be arranged.
J. H. Silbey.
History 311 examines the course of American politics from 1787 to the Civil War, focusing on the nature of decision making, popular and legislative voting behavior, and the role of interest groups, political parties, and political elites in shaping our political history. 312 continues the survey from 1865 to the present.

313–314 History of American Foreign Policy 313, fall; 314, spring. 4 credits each term. History 313 is not a prerequisite to 314.
T R S 11:15. W. LaFeber.
History 313 examines policy and policy-makers from Ben Franklin to Woodrow Wilson; 314 covers Wilson to Carter. Emphasis is placed on domestic events that shaped foreign policy.

316 American Intellectual and Cultural History to 1820 Fall. 4 credits.
R 2:30–4:25. F. Somkin.
Calvinism (the Puritans, the Protestant ethic, the

Great Awakening and Jonathan Edwards); the Enlightenment (science and society); the Early Republic (culture and ideology).

317 American Intellectual and Cultural History: The Nineteenth Century Spring. 4 credits.
M W F 11:15. F. Somkin.
Ideas, movements, and thinkers. Topics include the conflict between ideals and reality; the individual and society; Mormonism; reform movements such as temperance, women's rights, communitarianism, and antislavery; Darwinism; the Gospel of Wealth; and the rise of originality and radicalism in art and social thought.

[318 American Constitutional Development Spring. M. B. Norton. Not offered 1979–80; next offered 1980–81.]

[321 The Origins of American Civilization M. Kammen. Not offered 1979–80.]

322 American History, 1600–1700 Spring. 4 credits.
M W F 1:25. C. Brooks.
The origins of colonization; the establishment of the colonies, and of forms of government at all levels; the relationship between the colonies and England; and the evolution of social structures are considered. Emphasis is on the changing balance of forces between those aiding centralization and uniformity and those aiding fragmentation, and even disintegration, of institutions and values. The distinctiveness of ideas and institutions in America is examined.

325 Age of the American Revolution, 1763–1815 Fall. 4 credits.
T R 12:20–2. M. B. Norton.
An examination of the process by which the thirteen English colonies became an independent and united nation, with emphasis on political thought and practice, social and economic change, and cultural development.

326 Women in American Society, Past and Present Spring. 4 credits.
M W F 9:05. M. B. Norton.
A survey of women's experiences in America, from the seventeenth century to the present. Among the topics to be discussed are: women's familial roles, the changing nature of household work, the women's rights movement, employment of women outside the home, and contemporary feminism.

[330 The United States in the Middle Period Fall. J. H. Silbey. Offered alternate years. Not offered 1979–80; next offered 1981–82.]

[331 The American Civil War and Reconstruction Spring. J. H. Silbey. Offered alternate years. Not offered 1979–80; next offered 1981–82.]

332–333 The Urbanization of American Society 332, fall; 333, spring. 4 credits each term. History 332 is not a prerequisite to 333.
M W F 11:15. S. Blumin.
The process of urbanization is examined in America from the earliest European settlements to the present. Emphasis is on the development of urban forms, institutions, classes, and life-styles and on the changing impact of cities upon non-urban areas and the nation as a whole. History 332 goes up to the emergence of the industrial city (c. 1860); 333 covers the period from 1860 to the present.

[336 Survey of American Social History S. Blumin. Not offered 1979–80; next offered 1980–81.]

340–341 Recent American History, 1920 to the Present 340, fall; 341, spring. 4 credits each term. History 340 is not a prerequisite to 341.
T R 12:20; discussion to be arranged.
R. Polenberg.
History 340 topics include individualism and conformity in the 1920s; class, race, and ethnicity in the 1930s; Franklin Roosevelt and the New Deal; World War II, the atomic bomb, and the Nuremberg trials. 341 considers the Supreme Court and civil rights; McCarthyism and civil liberties; Kennedy, Johnson, and social reform; the Vietnam War and the protest movement; Watergate and the imperial presidency.

[345 The Modernization of the American Mind Fall. R. L. Moore. Not offered 1979–80; next offered 1980–81.]

[346 Major Themes in American Religious History Spring. R. L. Moore. Not offered 1979–80; next offered 1980–81.]

[411 Undergraduate Seminar in American Political History Spring. J. H. Silbey. Not offered 1979–80; next offered 1981–82.]

414 Motivations of American Foreign Policy Fall. 4 credits. Prerequisites: History 314 and permission of instructor.
R 1:25–3:15. W. LaFeber.
Topic for 1979: The Korean War and the domestic background.

[416 Undergraduate Seminar in American Cultural History F. Somkin. Not offered 1979–80.]

418 Undergraduate Seminar in the History of the American South Spring. 4 credits. Prerequisite: permission of instructor.
T 2:30–4:25. J. H. Silbey.
Topic for 1979–80: Slavery, the slave system, and the crisis of the Union, 1846–1861.

419 Undergraduate Seminar in American Social History Fall. 4 credits. Prerequisite: permission of instructor.
R 10:10–12:05. S. Blumin.
Topic for 1979–80: Industrialization and society; the evolving class structure of industrializing America.

[426 Undergraduate Seminar in Early American History M. B. Norton. Not offered 1979–80; next offered 1981–82.]

[430 Law and Authority in Nineteenth-Century America F. Somkin. Not offered in 1979–80.]

[440 Undergraduate Seminar in Recent American History R. Polenberg. Not offered in 1979–80.]

[445 Undergraduate Seminar: Deviance and Conformity in a Liberal Society Spring. R. L. Moore. Not offered 1979–80; next offered 1980–81.]

516 The Popular Mind in the United States Spring. 4 credits. Prerequisite: permission of instructor. Intended for graduate students and advanced undergraduates.
R 2:30–4:25. F. Somkin.
American popular culture: from the image of the hero and the myth of success to the world of the poolroom, the circus, the minstrel show, the dramatic and vaudeville stage, the cowboy epic, the gangster movie and toughguy novel, and professional sports.

521 Culture and Tradition in America Fall. 4 credits. Prerequisite: permission of the instructor. Open to graduate students and qualified majors in history or American studies.
T 3–5:30. M. Kammen.
Emphasis is on the changing impact of maritime, continental, and psychological frontiers upon national culture and shifting perceptions of tradition in imaginative literature, popular historical writing, and autobiography. The focal time period is 1840–1940. The focal question: how can a coherent sense of tradition develop in a pluralistic culture with an egalitarian ethos?

613–614 Graduate Seminar in American Foreign Relations 613, fall; 614, spring. 4 credits each term. Prerequisite: permission of the instructor.
Hours to be arranged. W. LaFeber.

615–616 Seminar in American Cultural and Intellectual History 615, fall; 616, spring. 4 credits each term.
Hours to be arranged. F. Somkin.

[617–618 Seminar in Recent American Cultural History R. L. Moore. Not offered 1979–80.]

[619 Seminar in American Social History S. Blumin. Not offered 1979–80.]

[626–627 Seminar in the History of American Women Spring. M. B. Norton. Not offered 1979–80. History 626 next offered 1980–81.]

633–634 Seminar in Nineteenth-Century American History 633, fall; 634, spring. 4 credits each term.
Hours to be arranged. J. H. Silbey.

710 Colloquium in American History Fall. 4 credits. Required of all first-year American history graduate students.
M 3:35–5:25. Staff.
Examination of the major themes, epochs, and interpretations of American history.

Asian History

[190 Introduction to Asian Civilizations: Origins to 1600 Not offered 1979–80; next offered 1980–81.]

191 Introduction to Asian Civilizations in the Modern Period Fall. 4 credits.
T R 11:15; plus an additional hour, M 1:25 or 2:30.
D. K. Wyatt, S. G. Cochran.
The history of Asian civilizations in modern times is introduced, focusing on the relationship between key figures and societies. English translations of autobiographies, novels, short stories, diaries, and other documents written by Asians are used to assess the perspectives, social priorities, and historical significance of intellectual and political leaders.

[393 History of China Up to Modern Times Fall. 4 credits. C. A. Peterson. Not offered 1979–80.]

394 History of China in Modern Times Spring. 4 credits.
T R 10:10; plus an additional hour to be arranged.
S. G. Cochran.
A survey which concentrates on the rise of the last imperial dynasty in the seventeenth and eighteenth centuries, the upheavals resulting from domestic rebellions and foreign imperialism in the nineteenth century, and the twentieth-century efforts to achieve social mobilization and political unity.

395 Southeast Asian History to the Fourteenth Century Fall. 4 credits.
T R 11:15; plus an additional hour to be arranged.
O. W. Wolters.
Early Southeast Asian history is surveyed and particular attention is paid to questions raised in the source material concerning religious beliefs and political and social assumptions.

[396 Southeast Asian History from the Fifteenth Century Spring. D. K. Wyatt. Not offered 1979–80; next offered 1980–81.]

[492 Undergraduate Seminar in Medieval Chinese History Spring. C. A. Peterson. Not offered 1979–80; next offered 1980–81.]

493 Self and Society in Late Imperial and Twentieth-Century China Fall. 4 credits. Prerequisite: History 191 and 394 or permission of instructor.
F 1:25–3:30. S. G. Cochran.
Conceptions of self and relationships between the individual and society in China from the seventeenth century to the present.

498 Undergraduate Seminar in Southeast Asian History Fall. 4 credits. Prerequisite: History 395 or permission of instructor.
Hours to be arranged. O. W. Wolters.
Systematic consideration of selected problems and episodes in Southeast Asian history, using indigenous historical sources in translation and relevant secondary sources.

[691 Chinese Historiography and Source Materials Fall. 4 credits. Prerequisite: permission of instructor. Not offered 1979–80.]

693–694 Problems in Modern Chinese History 693, fall; 694, spring. 4 credits each term. Prerequisite: permission of instructor.
Hours to be arranged. S. G. Cochran.

[696 Historiography of Southeast Asia Spring. D. K. Wyatt. Not offered 1979–80; next offered 1980–81.]

[791–792 Seminar on Medieval Chinese History C. A. Peterson. Not offered 1979–80; next offered 1980–81.]

793–794 Seminar in Modern Chinese History 793, fall; 794, spring. 4 credits each term. Prerequisite: permission of instructor.
Hours to be arranged. S. G. Cochran.

795–796 Seminar in Southeast Asian History 795, fall; 796, spring. 4 credits each term.
Hours to be arranged. D. K. Wyatt, O. W. Wolters.

Related Course in Another Department

Art and Society in Modern China (Society for the Humanities 390–391)

Ancient European History

265 The Emergence of Greek Democracy Fall. 4 credits. No prerequisites. Open to freshmen.
T R 1:25; discussion to be arranged. P. A. Rahe.
An introductory survey of ancient Greek history before the outbreak of the Peloponnesian War, prefaced by a brief examination of the character of political life in ancient Mesopotamia, Egypt, and Israel for comparison. The relationships between religion and politics and between socioeconomic change and political development in ancient Greece are examined. Selections from the Old Testament, Homer, Hesiod, Archilochus, Tyrtaeus, Aeschylus, Sophocles, and Herodotus are read in translation.

266 The Crisis of Greek Civilization Spring. 4 credits. No prerequisites. Open to freshmen.
T R 1:25; discussion to be arranged. P. A. Rahe.
An introductory survey of ancient Greek history from the end of the Persian Wars to the death of Alexander the Great. Particular attention is given to the intellectual crisis of the late fifth century and the origins of political philosophy. Selections from Euripides, Aristophanes, Thucydides, Xenophon, Plato, Aristotle, and Demosthenes are read in translation.

267 The Roman Republic Fall. 4 credits. Open to freshmen.
W F 10:10; discussion to be arranged.
A. H. Bernstein.
A survey of Roman Republic history from the origin of the city to the assassination of Julius Caesar. Special attention is paid to the development and nature of republican forms of government; to Rome's unification of the Italian peninsula and conquest and governance of the Mediterranean; to the course of the revolution that replaced the Republic with the imperial autocracy of the Caesars. Readings are drawn from the works of Polybius, Sallust, Cicero, Caesar, Livy, and Plutarch.

268 Rome of the Caesars Spring. 4 credits. Open to freshmen. History 267 not a prerequisite to 268.
W F 10:10; discussion to be arranged.
A. H. Bernstein.
A survey of Roman imperial history from the assassination of Julius Caesar to the collapse of effective governance in the West in the eighth century. Special attention will be paid to the governing methods of the dictatorship; provincial administration; the conflict between paganism and Christianity and the latter's triumph; and the inevitable theme of decline and fall. Readings from Tacitus, Suetonius, the Historia Augusta, and Ammianus Marcellinus.

[450 Archaic Greece, 778–500 B.C. P. A. Rahe. Not offered 1979–80.]

[452 Greece from Cleisthenes to Cleon, 514–429 B.C. P. A. Rahe. Not offered 1979–80.]

453 Thucydides and the Peloponnesian War, 432–404 B.C. Fall. 4 credits. Open to sophomores.
Hours to be arranged. P. A. Rahe.
The great war between Athens and Sparta is studied. Special attention is paid to military developments, the impact of the war on the political and social development of Athens and Sparta, and the reflections of Thucydides and his contemporaries on the war and the changes it brought. Thucydides' history of the war and selections from the work of Xenophon, Diodorus Siculus, Lysias, Aristotle, Sophocles, Euripides, and Aristophanes are read in translation.

[454 Greece in the Age of Lysander and Agesilaus, 410–360 B.C. Spring. P. A. Rahe. Not offered 1979–80; next offered 1980–81.]

[455 Philip of Macedon and Alexander the Great P. A. Rahe. Not offered 1979–80.]

460 Roman Imperialism Spring. 4 credits. Prerequisite: History 267–268 or permission of the instructor. Enrollment limited to 20 students.
Hours to be arranged. A. H. Bernstein.
An inquiry into the why and how of the Roman conquest of the Mediterranean world, from 387 to 146 B.C. Readings are drawn from Polybius, Livy, and Plutarch. Modern analyses of the Romans' notions of power, diplomacy, and empire are studied. Comparative materials, especially on the Mafia, are used where relevant.

[461 The Roman Revolution A. H. Bernstein. Not offered 1979–80.]

[462 The High Roman Empire A. H. Bernstein. Not offered 1979–80.]

[463 Decline and Fall of the Roman Empire A. H. Bernstein. Not offered 1979–80.]

561 Social and Economic History of Rome, 60 B.C. to A.D. 117 Fall. 4 credits. Prerequisites: History 267–268 or permission of instructor. Enrollment limited to 20 students. Intended for undergraduates.
Hours to be arranged. A. H. Bernstein.
An inquiry into the social and economic conditions of the Roman world between the time of Julius Caesar and that of the emperor Trajan. Readings include the ancient evidence in translation and study modern analyses of the period. Slavery, commerce, manufacturing, law (including the legislation of morality), religion and emperor worship, and provincial administration are considered.

[562 Roman Africa A. H. Bernstein. Not offered 1979–80.]

[661 Graduate Seminar in Ancient Classical History A. H. Bernstein. Not offered 1979–80.]

Medieval and Early Modern European History

[257 English History from Anglo-Saxon Times to the Revolution of 1688 Fall. C. Holmes. Not offered 1979–80; next offered 1980–81.]

263 The Earlier Middle Ages Spring. 4 credits.
M W F 12:20. J. J. John.
A survey of medieval civilization from c. 300 to c. 1100, dealing with religious, intellectual, political, and economic developments in Western Europe.

264 The High Middle Ages Fall. 4 credits.
T R 3–4:15. B. Tierney.
Medieval civilization from c. 1100 to c. 1450, dealing with religious, intellectual, political, and economic developments in Western Europe. Lectures and class discussions.

[350 Early Renaissance Europe J. Najemy. Not offered 1979–80.]

[351 Reformation and Counter-Reformation Europe J. Najemy. Not offered 1979–80.]

[359 The Early Development of Anglo-American Common Law Spring. C. Holmes. Not offered 1979–80; next offered 1980–81.]

361 Introduction to Renaissance Culture (also Comparative Literature 361) Fall. 4 credits. No prerequisites.
T R 1:25; discussion to be arranged. E. Morris, J. Najemy, with C. Gilbert, G. Mazzotta, D. Randel.
Renaissance culture is introduced through six major figures (Petrarch, Machiavelli, Leonardo da Vinci, Josquin des Pres, Erasmus, Rabelais). Readings and musical and visual examples allow students to deal directly with problems of interpretation. Fundamental assumptions about culture and historiography are examined.

365 Medieval Culture, 400–1150 Spring. 4 credits. Prerequisite: History 263 or permission of instructor.
T R 2:30–3:45. J. J. John.
Intellectual and cultural developments in the age of monasticism, from St. Augustine and St. Benedict to St. Anselm and St. Bernard of Clairvaux.

[366 Medieval Culture, 1100–1300 Spring. J. J. John. Not offered 1979–80; next offered 1980–81.]

367 Church and State During the Middle Ages Fall. 4 credits. Prerequisite: History 263 or 264 or permission of instructor. Open to graduate students.
T R 10:10–11:15. B. Tierney.
Relationships between ecclesiastical and secular authorities and the ways in which these relationships influenced the growth of government in the Middle Ages are considered. Particular attention is given to the growth of medieval constitutionalism.

[368 Francis of Assisi and the Franciscans Fall. B. Tierney. Not offered 1979–80; next offered 1980–81.]

369 History of Florence, 1250–1530 Spring. 4 credits.
M W F 1:25; discussion to be arranged. J. Najemy.
Florentine politics and society from communal origins through the guild republic to the Medicean regime and the establishment of the principate. Economy and social structure, cultural and religious development, and political and historical ideas are considered, as well as the evolution of Florentine government and institutions.

371 History of England Under the Tudors and Stuarts Spring. 4 credits.
T R 1:25–3:20. C. Brooks.
An examination of the relation between the intellectual developments of the period and political, social, and religious change. Particular attention is given to the apparently competing claims of liberty and authority. Material from American and European history is used to set the English developments in context.

468 Undergraduate Seminar in Renaissance History Fall. 4 credits.
W 2:30–4:30. J. Najemy.
Topic for 1979: Republicanism in the political thought and experience of Renaissance Italy.

469 Undergraduate Seminar on the Reformation Spring. 4 credits. Open to graduate students.
T R 2:30–3:45. J. Najemy.
Western Europe in the sixteenth century, with special attention to the intellectual, psychological, social, and political aspects of the religious question in both Protestant and Catholic Europe. The first half of the course deals with the great reformers of religious life (including Luther, Loyola, Calvin), and the second half with their impact on the structures of thought and society in Germany, France, England, and Italy.

[475 The English Civil War, 1640–1660 Fall. C. Holmes. Not offered 1979–80; next offered 1980–81.]

[663 Graduate Seminar in Renaissance History J. Najemy. Not offered 1979–80.]

[664–665 Seminar in Latin Paleography J. J. John. Not offered 1979–80; next offered 1980–81.]

[666 Seminar in Medieval History J. J. John. Not offered 1979–80; next offered 1980–81.]

669 Seminar in Medieval History Spring. 4 credits. Open to qualified undergraduates. Latin required.
Hours to be arranged. B. Tierney.
Topic for spring 1980: Introduction to medieval canon law.

[670 Seminar in Tudor and Stuart History C. Holmes. Not offered 1979–80.]

Modern European History

258 English History from the Revolution of 1688 to the Present Fall. 4 credits.
T R 10:10–12:05; discussion to be arranged.
D. A. Baugh.
An introduction to the making of modern England, emphasizing constitutional, intellectual, economic, and imperial developments.

352 The End of the Austro-Hungarian Monarchy, 1848–1918 Fall. 4 credits.
M W F 10:10. I. V. Hull.
The decline and fall of the multinational empire. Emphasis is on the political and social problems presented to the monarchy both by industrialization and by the increasingly restive subject nationalities (Poles, Czechs, Serbs, Croats). How did the monarchy handle these problems? Why did it fail? Focus is on cultural matters. Readings are drawn from Freud, Schnitzler, Hofmannsthal, Karl Kraus, Joseph Roth, and others.

[353–354 European Intellectual History in the Nineteenth and Twentieth Centuries 353, fall; 354, spring. 4 credits each term. First term not prerequisite to the second. D. C. LaCapra. Not offered 1979–80; 354 next offered 1980–81.]

355 The Old Regime, France in the Sixteenth, Seventeenth, and Eighteenth Centuries Fall. 4 credits.
T R 2:30–3:50. S. L. Kaplan.
A systematic examination of the social structure, economic life, political organization, and collective mentalities of a society which eclipsed all others in its time and then, brutally and irreversibly, began to age. France, in European perspective, from the wars of religion through the Age of Voltaire.

356 The Era of the French Revolution and Napoleon Spring. 4 credits.
T R 2:30–3:50. S. L. Kaplan.
A study of the failure of the traditional system, its dismantling and replacement in France, and the international consequences. Focus is on the meaning of the revolutionary experience, the tension between the desires to destroy and to create, and the implications of the Revolution for the modern world.

[357 Survey of German History, 1648–1890 Fall. 4 credits. I. V. Hull. Not offered 1979–80; next offered 1981–82.]

358 Survey of German History, 1890 to the Present Spring. 4 credits. Open to freshmen.
Lec, T R 9:05–10; discussions W 1:25–2:15 or R 1:25–2:15. I. V. Hull.
The "German problem" is examined. Major topics include tensions caused by rapid industrialization presided over by a preindustrial, political elite; origins of World War I; growth of anti-Semitism; social dislocations of World War I; failure of the socialist revolution of 1918–19; unstable Weimar democracy and the rise of Nazism; the Nazi state; World War II; the two Germanies.

362 Russian History to 1800 Fall. 4 credits. Open to freshmen.
T R 10:10–11:25. W. M. Pintner.
The origin and development of the fundamental social, political, economic, and cultural institutions that determined the nature of contemporary Soviet society.

363 Russian History Since 1800 Spring. 4 credits. Open to freshmen.
T R 10:10–11:25. W. M. Pintner.
Nineteenth- and twentieth-century Russia with emphasis on the major social, political, and economic changes that have transformed Russia since the mid-nineteenth century.

370 Europe in the Twentieth Century Fall. 4 credits.
M W F 1:25. J. H. Weiss.
An investigation of the major developments in European history since 1900. Emphasis upon the development of democratic political systems and their alternatives. Topics include the transforming effects of war and depression, the dynamics of fascism, the European response to the economic and ideological influence of American and the Soviet Union, and the politics of regional ethnicity.

[372 Social and Cultural History of Contemporary Europe Spring. J. H. Weiss. Not offered 1979–80; next offered 1980–81.]

374 War, Trade, and Empire, 1500–1815 Spring. 4 credits.
T R 9:05–10:45. D. A. Baugh.
Maritime enterprise, imperial policy, and naval power in the age of expansion. The rise and decline of the Portuguese and Spanish empires are considered, but the emphasis is on English, French, and Dutch rivalry in the Atlantic and Caribbean.

[375 Twentieth-Century Britain Fall. D. A. Baugh. Not offered 1979–80; next offered 1980–81.]

[451 Lord and Peasant in Europe: A Seminar in Social History S. L. Kaplan. Not offered 1979–80.]

456 Seminar on Germany, 1890–1918 Fall. 4 credits. Prerequisite: permission of instructor.
M 2:30–4:30. I. V. Hull.
A consideration of the many paradoxes of the Wilhelminian age — the last decades of the monarchy as it wrestled with economic and social change.

[457 Seminar in European Fascism Spring. I. V. Hull. 4 credits. Not offered in 1979–80; next offered 1981–82.]

458 Seminar in Weimar and Nazi Germany, 1918–1945 Spring. 4 credits. Prerequisite: History 358 or permission of instructor.
T 2:30–4:30. I. V. Hull.
The political, economic, social, and cultural history of the Weimar Republic and the Third Reich are examined in depth.

459 The Making of the English Ruling Class, 1660–1780 Fall. 4 credits.
M W 2:30–4. D. A. Baugh, C. Brooks.
The interrelationship of political and social history in England in the aristocratic age. Readings include works by Locke, Swift, Mandeville, Pope, Burke, Hume, and Adam Smith, as well as modern interpretations of the political and social history of the period.

[470 War and Revolution, 1912–20 Fall. J. H. Weiss. Not offered 1979–80; next offered 1980–81.]

471 Russian Social and Economic History Spring. 4 credits.
M 2:30–4:30. W. M. Pintner.
A seminar devoted to an examination of the transformation of Russia from a backward, agrarian nation to the second of the world's superpowers.

[474 Topics in Modern European Intellectual History Spring. 4 credits. D. C. LaCapra. Not offered 1979–80; next offered 1980–81.]

475 Resistance, Collaboration, and Retribution in World War II Spring. 4 credits. Prerequisite: permission of the instructor.
Hours to be arranged. J. H. Weiss.
A study of the response of European individuals, social groups, and political bodies to the extreme pressures of occupation, imprisonment, civil war, and Nazi extermination actions. The concluding section focuses primarily on the war crimes trials at Nuremberg.

476 Documenting the Depression: Film, Literature, and Memory Fall. 4 credits. Prerequisite: one course dealing with twentieth-century America, twentieth-century Britain, or film analysis.
Hours to be arranged. J. H. Weiss.
The experience of British and American society during the 1930s is studied through documentary evidence, particularly films. Industrial conflict, rural disorganization, government social policy, and the relationship between radicalism and nationalism in cultural expression are compared.

477 The Politics of the Enlightenment Spring. 4 credits.
W 2:30–4:30. S. L. Kaplan.
An inquiry into the historical origins of European (especially French) political thought beginning in the 1680s at the zenith of Louis XIV's absolutism and culminating in the French Revolution a century later. Emphasis is on the relationship of criticism and theory to actual social, economic, religious, and political conditions. An effort is made to assess the impact of enlightened thought on the eighteenth-century world and to weigh its implications for modern political discourse. Readings in translation from Bayle, Locke, Montesquieu, Voltaire, Rousseau, Hume, Diderot, Burke, and Paine as well as from modern scholarly and polemical literature.

[478 Seminar in Eighteenth-Century French Social History S. L. Kaplan. Not offered 1979–80.]

[655 Seminar in Eighteenth-Century British History D. A. Baugh. Not offered 1979–80; next offered 1980–81.]

656 Seminar in Nineteenth-Century British History Fall. D. A. Baugh. Not offered 1979–80; next offered 1980–81.]

[671 Seminar in the French Revolution S. L. Kaplan. Not offered 1979–80.]

[672 Seminar in European Intellectual History Fall. D. C. LaCapra. 4 credits. Not offered 1979–80.]

677 Seminar in Russian History Spring. 4 credits.
M 2:30–4:30. W. M. Pintner.

678 Seminar in Modern European Social History Spring. 4 credits.
Hours to be arranged. J. H. Weiss.
Research seminar. Topic for 1980: Education, professional structures, and social stratification since 1800.

679 Seminar in European History Fall. 4 credits. Prerequisites: reading knowledge of French and permission of instructor.
Hours to be arranged. S. L. Kaplan.
Research seminar. Topic for 1979–80: Origins of the French working class.

Latin American History

[210 Colonial Latin America Fall. T. H. Holloway. Not offered 1979–80; next offered 1980–81.]

[211 Latin America in the Modern Age Spring. T. H. Holloway. Not offered 1979–1980; next offered 1980–81.]

347 Agrarian Societies in Latin American History Spring. 4 credits.
T R 2:30–3:50. T. H. Holloway.
The development of rural patterns of wealth, status, and power, focusing on the role of country people in the larger society. Topics include disruption of the conquest, evolution from encomienda to hacienda, rise of plantation agriculture and export enclaves, decline of Indian communities, peasant protest, and land reform and development programs of the recent past.

348 Contemporary Brazil (also Sociology 368) Spring. 4 credits. Prerequisites: two courses in the social sciences.
M W F 1:25. T. H. Holloway, J. Kahl.
A study of the style of development in economy, polity, and society followed by contemporary Brazil, and an analysis of the contradictions that led to the military coup of 1964 and its aftermath. Some comparisons are made with other Latin American countries. Readings in English.

[649 Seminar in Latin American History Spring. T. H. Holloway. Not offered 1979–80; next offered 1980–81.]

Honors and Research Courses

301 Supervised Reading Fall or spring. 2 credits. Prerequisite: permission of instructor. Open only to upperclass students.

302 Supervised Research Fall or spring. 3 or 4 credits. Prerequisite: permission of instructor. Open only to upperclass students.

400 Honors Proseminar Fall or spring. 4 credits. For prospective honors candidates with permission of instructor.
Fall: W 2:30–4:30, D. K. Wyatt. Spring: T 1:25–3:30, M. Kammen.
An introduction to historical writing and modes of research, emphasizing the possibilities and limitations of historical inquiry.

401 Honors Guidance Fall or spring. 4 credits. Prerequisites: History 400 and permission of instructor.

703–704 Supervised Reading 703, fall; 704, spring. 4 credits each term. Prerequisite: permission of instructor. Open only to graduate students.

Society for the Humanities Seminars of Interest to History Students

Humanistic Interpretations of Spanish History (Society for the Humanities 413)

Colonial History of Spanish America (Society for the Humanities 414)

Method in Intellectual History (Society for the Humanities 423)

***Madame Bovary* on Trial (Society for the Humanities 424)**

The Mental World of the English People, 1450–1750 (Society for the Humanities 425)

History of Art

Freshman Seminars

The History of Art courses listed below are offered in the Freshman Seminar Program and as freshman electives, but may not be used to satisfy the distribution requirement.

103 Freshman Seminar in Visual Analysis Fall or spring. 3 credits.
Fall: M W F 9:05, 10:10, 11:15, or 12:20; or T R 10:10–11:25, or 12:20–1:35. Staff. Spring: M W F 9:05, 10:10, 11:15, or 12:20; or T R 10:10–11:25. Staff.
Understanding the nature of man-made objects, from tools to cities. Such conventional categories as painting, sculpture, and architecture are included. An introduction to the problems of perceiving such objects and articulating the visual experience. A supplement, not a prerequisite, to art history, organized by media and themes rather than chronologically.

104 How to Look at Works of Art Fall or spring. 3 credits.
Fall: T R 2:30–3:45, H. P. Kahn. Spring: T R 2:30–3:45, J. V. Falkenheim.
Several major works of art, primarily paintings, are examined in detail. The cultural and historical contexts in which the works were created and their unique qualities as works of art are considered.

[106 Art in a Landscape 3 credits. S. J. O'Connor. Not offered 1979–80.]

107 Principles of Architecture Spring. 3 credits.
M W F 12:20. T. M. Brown.
Through readings, lectures, and discussions, examination of some theoretical and practical aspects of architecture as it affects our lives.

Related Course in Another Department

Revolution and the Russian Arts (Russian Literature 106)

Introductory Courses

The following courses are designed to introduce students to the processes and methods of art history by means of a systematic examination of a closely related body of visual material. The courses need not be taken in any particular sequence. One 200-level course is normally the prerequisite to courses at the 300 level.

[210 Introduction to Art History: Beginnings of Civilization 3 credits. Not offered 1979–80.]

220 Introduction to Art History: Art of the Classical World (also Classics 220) Fall. 3 credits.
M W F 10:10. A. Ramage.
The sculpture, vase painting, and architecture of the ancient Greeks, from the Geometric period through the Hellenistic and the art of the Romans from the early Republic to the late Empire.

230 Introduction to Art History: Monuments of Medieval Art Fall. 3 credits.
M W F 9:05. R. G. Calkins.
An introduction to the approaches to art history through a study of selected works of art from the Middle Ages: architecture, sculpture, painting, manuscript illumination, metal work, and ivory.

240 Introduction to Art History: The Renaissance Spring. 3 credits. Fee for photocopied reading material, $3.
M W F 10:10; plus one discussion, M 11:15, 12:20, 2:30, or T 9:05. E. G. Dotson.
A study of selected works of architecture, sculpture, and painting in Italy and northern Europe from about 1300 to about 1575. Major artists considered include Donatello, Jan van Eyck, Michelangelo, and Bruegel. Various approaches to the understanding of works of art and various interpretations of the Renaissance are explored.

[250 Introduction to Art History: The Baroque Era 3 credtis. Not offered 1979–80.]

261 Introduction to Art History: Modern Art Fall. 3 credits.
T R 10:10–11:25. J. V. Falkenheim.
A topical discussion of some of the major artists, movements, and ideas that make up modern art. Emphasis is on European and American painting in relationship to cultural and intellectual concerns of the period spanning approximately 1800 to 1950.

270 Introduction to Art History: American Art Fall. 3 credits.
T R 12:20–1:35. T. W. Leavitt.
Art in the British colonies and in the United States from seventeenth-century beginnings to the early years of the twentieth century. The emphasis is on the development of American painting during the late eighteenth and through the nineteenth century.

[280 Introduction to Art History: Asian Traditions 3 credits. S. J. O'Connor. Not offered 1979–80.]

290 Introduction to Art History: Architecture and Environment Spring. 3 credits. Limited to 50 students.
M W F 1:25. T. M. Brown.
Emphasis is placed on the social and humanistic aspects of nineteenth- and twentieth-century design. After a lengthy introduction to the architectural categories of space, form, function, and structure, the ideas and forms that have influenced the physical shape of the contemporary world are considered.

Related Courses in Another Department

Mediterranean Archaeology (Classics 200)

Rise of Classical Greece (Classical 206)

Minoan-Mycenaean Art and Archaeology (Classics 221)

Intermediate Courses

The following courses are intended primarily for upperclass students, qualified sophomores, and first-year graduate students. Except as noted, all require as a general prerequisite one course at the 200 level. Some of the courses have discussion sections.

311 Techniques and Materials: Painting Spring. 4 credits. Limited to 50 students.
T R 10:10–12:05. H. P. Kahn.
The techniques of painting in their historical and formal contexts; analytical research of materials and conservation.

313 Books, Prints, and the Graphic Image Fall. 4 credits. Limited to 50 students.
T R 10:10–12:05. H. P. Kahn.
The history and formal evolution of letters, types, illustrations, books, and publications; theories of design and message.

[320 The Archaeology of Classical Greece (also Classics 320) 4 credits. A. Ramage. Not offered 1979–80.]

[322 Arts of the Roman Empire (also Classics 322) 4 credits. A. Ramage. Not offered 1979–80.]

[323 Painting in the Greek and Roman World (also Classics 323) 4 credits. A. Ramage. Not offered 1979–80.]

[324 Architecture in the Greek and Roman World (also Classics 324) 4 credits. A. Ramage. Not offered 1979–80.]

325 Greek Vase Painting (also Classics 325) Fall. 4 credits.
W 2:30–4:30 plus one hour to be arranged.
A. Ramage.
A stylistic and iconographical approach to an art in which the Greeks excelled. The course is arranged chronologically, from the early (eleventh century B.C.) anonymous beginnings through the "personal" hands of identifiable masters of the fifth and fourth centuries B.C. Styles other than Attic are stressed.

[326 Art and Archaeology of Archaic Greece (also Classics 326) Not offered 1979–80.]

327 Greek and Roman Coins (also Classics 327) Spring. 4 credits.
M 2:30–4:30 plus one hour to be arranged.
A. Ramage.
The varied issues of Greek cities and the Roman state are examined. Coins are considered as art objects as well as economic and historical documents. The changes in design, value, and metals from the origins of coinage to the Late Roman period are studied. Lectures, student presentations, work with actual examples.

330 Art in Pompeii: Origins and Echoes (also Classics 330) Spring. 4 credits.
M W F 10:10. A. Ramage.
Greek and Roman art in the context of the daily life of a provincial Italo-Greek town. The interrelation of art and household objects in classical culture is stressed and earlier traditions are described. The subsequent development of the Roman minor arts is covered, as well as the discovery of Pompeii and its effect on European taste.

[332 Architecture of the Middle Ages 4 credits. R. G. Calkins. Not offered 1979–80.]

[333 Early Medieval Art and Architecture 4 credits. R. G. Calkins. Not offered 1979–80; next offered 1980–81.]

[334 Romanesque Art and Architecture 4 credits. R. G. Calkins. Not offered 1979–80; next offered 1981–82.]

[335 Gothic Art and Architecture 4 credits. R. G. Calkins. Not offered 1979–80; next offered 1981–82.]

336 Late Medieval Italian Art and Architecture Fall. 4 credits.
M W F 11:15. C. E. Gilbert.
Thirteenth- and fourteenth-century Italian sculpture, painting, and some architecture, including the works of Duccio, Giotto, and the Lorenzetti.

337 The Medieval Illuminated Book Spring. 4 credits.
M W F 11:15. R. G. Calkins.
A study of selected major examples of medieval illuminated manuscripts from between A.D. 300 and 1500. Facsimiles and actual manuscripts are examined.

[341 Flemish Painting 4 credits. Not offered 1979–80.]

342 Medieval and Renaissance German Art Spring. 4 credits.
M W F 9:05. R. G. Calkins.
A study of the German contribution in panel painting, graphic art, and sculpture in the fourteenth, fifteenth, and sixteenth centuries. Emphasis is on the art of Bohemia and the works of Meister Bertram, Schongauer, Dürer, Grunewald, Baldung Grien, Cranach, and Holbein.

343 Italian Renaissance Art of the Fifteenth Century Spring. 4 credits.
M W F 10:10. C. E. Gilbert.
Architecture, sculpture, and painting from Brunelleschi, Donatello, and Masaccio to Leonardo da Vinci.

[344 Italian Renaissance Art of the Sixteenth Century Fall. 4 credits. C. E. Gilbert. Not offered 1979–80; next offered 1980–81.]

[345 Sculpture of the Italian Renaissance 4 credits. Not offered 1979–80.]

[355 French Art of the Sixteenth and Seventeenth Centuries Fall. 4 credits. E. G. Dotson. Not offered 1979–80; next offered 1980–81.]

357 European Art of the Eighteenth Century Fall. 4 credits.
M W F 9:05. E. G. Dotson.
A study of tradition, change, and revolution in the architecture, painting, sculpture, and minor arts of eighteenth-century Europe. Emphasis is on a selected sequence of European centers where the various styles underwent an especially brilliant, original, or influential development. An effort will be made to relate these developments to the cultural background of the period.

[359 Major Masters of the Graphic Arts 4 credits. H. P. Kahn, A. S. Roe. Not offered 1979–80.]

[361 Modern Artists and Their Critics 4 credits. J. V. Falkenheim. Not offered 1979–80.]

362 Topics in Modern Art Spring. 4 credits.
T R 10:10–11:25. J. V. Falkenheim.
Topic to be announced.

[364 Modern Sculpture: From Rodin to Rickey 4 credits. R. C. Hobbs. Not offered 1979–80.]

365 Art from 1940 to the Present: From Hoffmann to Haacke Fall. 4 credits. Prerequisite: History of Art 261.
T R 12:20–1:35. R. C. Hobbs.
Major movements and figures working in the United States since 1940, beginning with Abstract Expressionism and continuing to conceptual and feminist art. Some attention is devoted to the critical reception that artists have received but major emphasis is on the artists' statements themselves.

374 American and European Decorative Arts of the Renaissance and Early Nineteenth Century Fall. 4 credits.
T R 12:20–1:35. A. S. Roe.
The evolution of the successive major styles in European interior design and furnishing are studied in relation to their impact upon the arts and crafts of the colonies and of the United States, from the earliest period until the advent of mechanized production.

[376 Painting and Sculpture in America: 1850–1950 4 credits. T. W. Leavitt. Not offered 1979–80.]

[378 American Architecture, the City, and American Thought: 1850–1950 4 credits. T. M. Brown. Not offered 1979–80.]

[379 Art and Technology: 1850–1950 4 credits. T. M. Brown. Not offered 1979–80.]

[381 Buddhist Art in Asia 4 credits. S. J. O'Connor. Not offered 1979–80.]

[383 The Arts of Early China 4 credits. M. W. Young. Not offered 1979–80; next offered 1981–82.]

384 The Arts of Japan Spring. 4 credits. No prerequisites.
M W 12:20; plus discussion to be arranged.
M. W. Young.
An introduction to the visual arts of Japan. Although a general chronological pattern is followed, the arts are approached topically, with emphasis on the developments of the recent centuries. Painting, woodblock prints, and the minor arts of the Meiji era receive particular attention. Term paper option for the final exam.

385 Chinese Painting Fall. 4 credits. No prerequisites. Intended for students with no previous experience of China or art history.
M W 12:20; plus discussion to be arranged.
M. W. Young.
An introduction to the arts of China from the medieval period to the modern age. The course focuses on developments in the art of painting, especially landscapes, but related arts such as ceramics, architecture, and sculpture are discussed. Discussion sections use the collection of the Herbert F. Johnson Museum of Art. Term paper option for the final exam.

[386 Studies in Indian and Southeast Asian Art 4 credits. S. J. O'Connor. Not offered 1979–80.]

Society for the Humanities 390–391 Art and Society in Modern China 390, fall; 391, spring. 4 credits each term.
Fall: discussions, W 2:30–4:30; plus some Tuesday evenings, 7:30–9, for slide shows or films. Spring: hours to be arranged. S. Cochran, M. W. Young.
The relationship between the visual arts and social change in China from the seventeenth century to the present. The value of art as a reflection of social reality and as an agent for social reform is analyzed on the basis of a variety of visual materials, which will range from calligraphy, paintings, and porcelains of the seventeenth and eighteenth centuries to woodblock prints, photographs, and films of the nineteenth and twentieth centuries.

Related Courses in Another Department

Archaeology of Cyprus (Classics 321)

Greek Sculpture (Classics 329)

Seminars

Courses at the 400 level are open to upperclass students, majors, and graduate students. Seminars at the 500 level are primarily for graduate students, but qualified upperclass students may be admitted. All seminars involve the writing and presentation of research papers. Enrollment is limited, and consent of the department or instructor is normally required. Students may repeat 500-level courses that cover a different topic each semester.

401 Independent Study Fall or spring. 2 credits. Prerequisite: permission of a department faculty member.
Hours to be arranged. Staff.
Individual investigation and discussion of special topics not covered in the regular course offerings, by arrangement with a member of the department. May be repeated for credit.

402 Independent Study Fall or spring. 4 credits. Prerequisite: permission of a department faculty member.
Hours to be arranged. Staff.
Individual investigation and discussion of special topics not covered in the regular course offerings, by arrangement with a member of the department. May be repeated for credit.

[405 Original Works of Art 4 credits. C. E. Gilbert. Not offered 1979–80.]

[406 Introduction to Museums 2 credits. T. W. Leavitt. Not offered 1979–80.]

[421 History of Art Criticism 4 credits. J. V. Falkenheim. Not offered 1979–80.]

[423 Ceramics 4 credits. A. Ramage. Not offered 1979–80.]

[431 Greek Sculpture (also Classics 431) 4 credits. A. Ramage. Not offered 1979–80.]

[448 Mannerism and the Early Baroque Era in Italy 4 credits. E. G. Dotson. Not offered 1979–80.]

449 Studies in Italian Renaissance Art Fall. 4 credits.
M 2:30–4:30. C. E. Gilbert.
Topic for 1979: Giotto and his age, including sculptors and/or painters of Siena.

[452 Studies in English Art A. S. Roe. 4 credits. Not offered 1979–80.]

[456 Literature and the Arts in Sixteenth-Century France (also French 456) 4 credits. E. G. Dotson, E. P. Morris. Not offered 1979–80.]

458 Classic and Romantic Art Spring. 4 credits.
W 2:30–4:30. E. G. Dotson.
Topic for 1980: Piranesi as printmaker, designer, architect, archeologist, and polemicist.

464 Studies in Modern Art Fall. 4 credits.
R 2:30–4:30. J. V. Falkenheim.
Topic to be announced.

[465 Problems in Modern Art and Architecture 4 credits. T. M. Brown. Not offered 1979–80.]

[476 Seminar on American Art: 1840–1940 4 credits. T. W. Leavitt. Not offered 1979–80.]

[482 Ceramic Art of Asia 4 credits. S. J. O'Connor. Not offered 1979–80.]

[483 Chinese Art of the T'ang Dynasty 4 credits. M. W. Young. Not offered 1979–80.]

486 Studies in Chinese Painting Spring. 4 credits. Prerequisite: History of Art 385 or permission of instructor.
M 2:30–4:30. M. W. Young.
Topic for 1980: Expressionism in late Chinese painting. A detailed consideration of the individualists and eccentrics of the seventeenth and eighteenth centuries and the role of expression in Chinese art of the modern age. Term reports expected.

[488 Traditional Arts in Southeast Asia 4 credits. S. J. O'Connor. Not offered 1979–80.]

493 Honors Work Fall or spring. 4 credits. S-U grades only. Intended for senior art history majors who have been admitted to the honors program.
Hours to be arranged. Staff.
Basic methods of art historical research are discussed and individual readings assigned, leading to the selection of an appropriate thesis topic.

494 Honors Work Fall or spring. 4 credits. Prerequisite: History of Art 493.
Hours to be arranged. Staff.
The student, under faculty direction, prepares a senior thesis.

[531 Problems in Medieval Art and Architecture 4 credits. R. G. Calkins. Not offered 1979–80.]

540 Seminar in Renaissance Art Spring. 4 credits.
T 2:30–4:30. C. E. Gilbert.
Topic for 1980: Donatello and his age, including painters such as Masaccio, Piero della Francesca, or Mantegna.

[564 Problems in Modern Art 4 credits. R. C. Hobbs. Not offered 1979–80.]

[580 Problems in Asian Art 4 credits. S. J. O'Connor. Not offered 1979–80.]

591–592 Supervised Reading 591, fall; 592, spring. 4 credits. May be repeated for credit. Limited to graduate students.

[595 Methodology Seminar 4 credits. Not offered 1979–80.]

[596 Problems of Art Criticism 4 credits. Not offered 1979–80.]

Related Courses in Other Departments

Courses given in archaeology, Classics, and Near Eastern studies often complement history of art courses.

Mathematics

General Courses

Students wanting a general introductory mathematics course are advised to take 107–108 (see description below).

401 Honors Seminar Fall. 4 credits. Prerequisite: permission of instructor.
Students will discuss selected topics under the guidance of one or more members of the staff.

403 History of Mathematics Spring. 4 credits. Prerequisite: one term of calculus and permission of instructor.
Lec, M W F 9:05.
Topics in mathematics from antiquity to the present.

690 Supervised Reading and Research Variable credit (up to 6 credits each term).

Basic Sequences

103 Mathematics for Architects (also Architecture 221) Fall. 3 credits.
Lec, T 10:10; 2 rec, to be arranged.
Rudiments of calculus and introduction to vectors and matrices.

105 Finite Mathematics for Biologists (also Engineering T&AM 105) Fall. 3 credits. Prerequisite: three years of high school mathematics including trigonometry.
Preliminary exams: 7:30 p.m., Oct. 4, Nov. 1, Nov. 29.
Models, analytic geometry, difference equations, elementary linear algebra, probability. Examples from biology are used.

106 Calculus for Biologists (also Engineering T&AM 106) Spring. 3 credits. Prerequisite: Mathematics 105 or three years of high school mathematics, including trigonometry and analytic geometry.
Preliminary exams: 7:30 p.m., Feb. 21, March 27, April 24.
Introduction to differential and integral calculus, partial derivatives, elementary differential equations. Examples from biology are used.

107 Finite Mathematics Fall or spring. 3 credits. This course cannot be used toward fulfillment of the mathematics requirement for biology majors. Prerequisite: three years of high school mathematics, including at least two years of high school algebra.
Lec: fall, T R 12:20 plus 2 hours to be arranged; spring, T R 11:15 plus 2 hours to be arranged.
Preliminary exams: fall, 7:30 p.m., Oct. 4, Nov. 1, Nov. 29; spring, 7:30 p.m., Feb. 21, March 27, April 24.
Functions, enumeration, permutations and combinations, probability, vectors and matrices, Markov chains.

108 Introduction to Calculus Spring. 3 credits. This course does not normally provide adequate preparation for any higher course in mathematics; nor can it be used toward fulfillment of the mathematics requirement for biology majors. Intended primarily for students in the more descriptive areas of the social sciences. Prerequisite: three years of high school mathematics including trigonometry and analytic geometry of the line and circle. Math 107 is recommended, but not required.
Lec, T R 12:20 plus 2 hours to be arranged.
Preliminary exams: 7:30 p.m., Feb. 21, March 27, April 24.
Behavior of functions, introduction to differential and integral calculus, elementary differential equations.

109 Precalculus Mathematics Fall. 3 transcript credits only; cannot be used toward graduation.
M W F 11:15.
This course is designed to prepare students for Mathematics 111 or 108. Algebra, trigonometry, logarithms, and exponentials are reviewed.

111 Calculus Fall or spring. 3 credits. Prerequisite: Mathematics 109 or three years of high school mathematics including trigonometry. Intended for students who have a good background in high school mathematics but who have not studied calculus. See Mathematics 113.
Lec: fall, T R 11:15 or 12:20, plus 2 hours to be arranged; spring, T R 11:15 plus 2 hours to be arranged. Preliminary exams: fall, 7:30 p.m., Sept. 25, Oct. 23, Nov. 20; spring, 7:30 p.m., Feb. 12, March 11, April 15.
Plane analytic geometry, differentiation and integration of algebraic and trigonometric functions, applications of differentiation, logarithmic and exponential functions.

112 Calculus Fall or spring. 3 credits. Prerequisites: Mathematics 106 or 111 or 113 with a grade of C or better, or exceptional performance in Mathematics 108. (Those who do extremely well in Mathematics 111 or 113 should take 122 instead of 112, unless they plan to continue with Mathematics 214–217.)
Lec: fall, T R 11:15 plus 2 hours to be arranged; spring, T R 11:15 or 12:20 or M W 12:20, plus 2 hours to be arranged. Preliminary exams: fall, 7:30 p.m., Sept. 25, Oct. 23, Nov. 20; spring, 7:30 p.m., Feb. 12, March 11, April 15.
Applications of integration, techniques of integration, partial derivatives and extremal problems, multiple integrals.

113 Calculus Fall. 3 credits. Prerequisite: Mathematics 109 or three years of high school mathematics, including trigonometry. This course covers the same material as Mathematics 111, but it is intended for students who have had enough calculus to be able to differentiate polynomial functions.
Lec: T R 11:15, plus 2 hours to be arranged. Preliminary exams: 7:30 p.m., Sept. 25, Oct. 23, Nov. 20.

122 Calculus Fall or spring. 4 credits. Prerequisite: performance at a high level in Mathematics 111 or 113 or permission of the department. (Students planning to continue with Mathematics 214–217 are advised to take 112 instead of this course.)
Lec: fall, M W F 10:10, 11:15, or 12:20; spring, M W F 9:05 or 10:10.
Differentation and integration of elementary transcentental functions, the techniques of integration, applications, polar coordinates, infinite series, and complex numbers. The approach is more theoretical than in Mathematics 112.

191–193 Calculus for Engineers Fall. 4 credits. Prerequisite: three years of high school mathematics, including trigonometry. Mathematics 193 is a course parallel to 191 for students who have had a substantial amount of calculus in high school, but who did not place out of 191. Although the same topics will be covered in 193 as in 191, some may be treated in greater depth in 193.
Lec: 191, M W F 9:05 plus 2 hours to be arranged; Mathematics 193, MW F 9:05 or 11:15 plus 2 hours to be arranged. Preliminary exams: 7:30 p.m., Oct. 2, Oct. 30, Nov. 27.
Plane analytic geometry, differential and integral calculus, and applications.

192 Calculus for Engineers Fall or spring. 4 credits. Prerequisite: Mathematics 191 or 193.
Lec: fall, M W F 11:15 plus 2 hours to be arranged; spring, M W F 9:05 or 11:15 plus 2 hours to be arranged. Preliminary exams: fall, 7:30 p.m., Sept. 27, Oct. 25, Nov. 29; spring, 7:30 p.m., Feb. 21, March 27, April 24.
Transcendental functions, technique of integration and multiple integrals, vector calculus, analytic geometry in space, partial differentiation, applications.

[201 Mathematics for Social Scientists Fall. 4 credits. Not offered 1979–80.]

214–215–216–217 Fall or spring.1 credit each. Prerequisite: Mathematics 112 or 122. These courses are taught as a unified package in the expected order Mathematics 217, 214, 215, 216 for three or four weeks each. Students may register for any subset of these courses in accordance with their interests and needs. However, no credit can be received for Mathematics 216 if 192 or 194 is taken nor can credit be received for Mathematics 214 or 216 if 221 is taken, nor can credit be received for Mathematics 217 if either 122 or 293 is taken. Students in doubt about their choices should consult their adviser and the course instructor. Preliminary exams will be given some evenings at 7:30 p.m. All students should attend the first lecture of the semester to learn the order in which these courses are taught, the dates for each course, the examination dates, and the structure of the whole.
Lec, T R 11:15 and F 8 plus 2 hours to be arranged.

214 Introduction to Differential Equations Prerequisite: Mathematics 217 or equivalent material from Mathematics 122 or 293.
Simple first- and second-order equations with applications.

215 Systems of Ordinary and Partial Differential Equations Prerequisites: Mathematics 214 and 217 or equivalent material from Mathematics 122 or 293. Introduction to numerical methods of solution, systems of differential equations, elementary partial differential equations, and boundary value problems. Applications.

216 Vector Analysis Vectors, matrices, vector valued functions. Line integrals.

217 Infinite Series and Complex Numbers

221 Linear Algebra and Calculus Fall or spring. 4 credits. Prerequisite: Mathematics 122 with a grade of B or better, or permission of instructor.
Fall, M W F 9:05, 10:10, or 11:15; spring, M W F 10:10 or 11:15.
Linear algebra and differential equations. Topics include vector algebra; linear transformations, matrices, linear differential equations, as well as an introduction to proving theorems.

222 Calculus Fall or spring. 4 credits. Prerequisite: Mathematics 221.
Fall, M W F 11:15 or 12:20; spring, M W F 9:05 or 10:10 or 11:15.
Vector differential calculus, calculus of functions of several variables, multiple integrals.

293 Engineering Mathematics Fall or spring. 3 credits. Prerequisites: Mathematics 192 or 194 plus a knowledge of computer programming equivalent to that taught in Engineering DBS 105. In exceptional circumstances, Mathematics 192 and 293 may be taken concurrently.
Lec: fall, M W F 10:10 or 12:20 plus hour to be arranged. Preliminary exams: fall, 7:30 p.m., Sept. 27, Oct. 25, Nov. 29; spring, 7:30 p.m., Feb. 19, March 25, April 22.
Infinite series, complex numbers, first and second order ordinary differential equations with applications in the physical and engineering sciences.

294 Engineering Mathematics Fall or spring. Fall: 3 credits; spring: 4 credits. Prerequisite: Mathematics 293.
Lec: fall, M W 12:20 plus hour to be arranged; spring, M W 10:10 or 12:20 plus hour to be arranged. Preliminary exams: fall, 7:30 p.m., Sept. 27, Oct. 25, Nov. 27; spring, 7:30 p.m., Feb. 19, March 25, April 22.
Vector spaces and linear algebra, matrices, eigenvalue problems and applications to systems of linear differential equations. Vector calculus. Boundary value problems and introduction to Fourier series.

Applied Mathematics and Differential Equations

305 Mathematics in the Real World Spring. 3 credits. Prerequisite: Mathematics 222 or 294 or permission of instructor.
This course is the same as Engineering OR&IE 431.

421 Applicable Mathematics Fall or spring. 4 credits. Prerequisites: high level of performance in Mathematics 294, or 217 and 222, or 214–217 and 331. Graduate students who need mathematics extensively in their work and who have had a solid advanced calculus course and complex variables course as undergraduates should take Mathematics 515–516. With less preparation they should take Mathematics 421–422–423. Students who have not had infinite series, some linear algebra, and some ordinary differential equations should take Mathematics 214–217, 331, and then Mathematics 421–422–423.
T W R F 12:20.
Theorems of Stokes, Green, Gauss, etc. Sequences and infinite series. Fourier series and othogonal functions. Ordinary differential equations. Solution of partial differential equations by separation of variables.

422 Applicable Mathematics Spring. 4 credits. Prerequisite: Mathematics 421.
T W R F 12:20.
Complex variables. Generalized functions. Fourier transforms, Laplace transforms. Partial differential equations.

423 Applicable Mathematics Fall. 4 credits. Prerequisite: Mathematics 421; however, students who have not taken 422 should talk to the instructor before taking this course.
T W R F 12:20.
Normed vector spaces. Elementary Hilbert space theory. Projections. Fredholm's alternative. Eigenfunction expansions. Applications to elliptic partial differential equations, and to integral equations.

[427 Introduction to Ordinary Differential Equations Fall. 4 credits. Not offered 1979–80.]

428 Introduction to Partial Differential Equations Spring. 4 credits. Prerequisite: Mathematics 222 or 294 or permission of instructor.
M W F 9:05.
Topics selected from: first order quasilinear equations, classification of second-order equations, characteristics. Laplace, heat, and wave equations with emphasis on maximum principles, existence, uniqueness, stability. Fourier series methods, approximation methods.

Analysis

311 Elementary Analysis Fall. 4 credits. Prerequisites: Mathematics 214–217. Mathematics 311 is similar to that of 411 below, but is taught at a more elementary level and at a slower pace. A student may not receive credit for both Mathematics 311 and 411 or 413.
M W F 12:20.
A careful study of the topology of the real line. Continuous functions of one real variable. Differentiation and integration of such functions.

411–412 Introduction to Analysis 411, fall; 412, spring. 4 credits each term. Prerequisite: Mathematics 222. Students needing measure theory and Lebesgue integration for advanced probability courses should take Mathematics 413–414, or arrange to audit the first few weeks of Mathematics 521.
T R 8:40–9:55.
An introduction to the theory of functions of real variables, stressing rigorous logical development of the subject rather than technique of applications. Topics include metric spaces, the real number system, continuous and differentiable functions, integration, convergence and approximation theorems, Fourier series, calculus in several variables, and differential forms.

413–414 Introduction to Analysis 413, fall; 414, spring. 4 credits each. Prerequisite: Mathematics 222.
T R 8:40–9:55.
Honors version of Mathematics 411–412. Parts of measure theory and Lebesgue integration are also covered.

418 Introduction to the Theory of Functions of One Complex Variable Spring. 4 credits.
Prerequisite: Mathematics 222 or 294 or 214–217.
M W F 9:05.
A rigorous introduction to complex variable theory, intended mainly for undergraduates and for graduate students outside mathematics. Complex numbers. Differential and integral calculus for functions of a complex variable including Cauchy's theorem and the calculus of residues. Elements of conformal mapping.

Algebra

331 Linear Algebra Fall. 4 credits. Prerequisite: one year of calculus. A student may not receive credit for both Mathematics 331 and any one of Mathematics 221, 293, 295.
M W F 10:10.
Vectors, matrices, and linear transformations, affine and Euclidean spaces, transformation of matrices, and eigenvalues.

332 Algebra and Number Theory Spring. 4 credits. Prerequisite: one year of calculus. Mathematics 332 does not satisfy prerequisites for courses numbered 500 and above.
M W F 10:10.
Commutative rings with unity, fields, and finite groups. Motivations and examples are derived mostly from arithmetical problems on the integers or congruence classes of integers.

431–433 Introduction to Algebra Fall. 4 credits. Prerequisite: Mathematics 221 or 331. Mathematics 433 is an honors section which will be more theoretical and rigorous than Mathematics 431 and will include additional material such as multilinear and exterior algebra.
M W F 10:10.
An introduction to linear algebra, including the study of vector spaces, linear transformation, matrices, and systems of linear equations; quadratic forms and inner product spaces; canonical forms for various classes of matrices and linear transformations; determinants.

432–434 Introduction to Algebra Spring. 4 credits. Prerequisite: Mathematics 431 or 433. Mathematics 434 is an honors section that will be more theoretical and rigorous than Mathematics 432.
M W F 10:10.
An introduction to various topics in abstract algebra, including groups, rings, fields, factorization of polynomials and integers, congruences, and the structure of finitely generated modules over Euclidean domains with application to canonical forms of matrices.

Geometry and Topology

451–452 Classical Geometries 451, fall; 452, spring. 4 credits each term. Prerequisite: 221 or 331 or permission of instructor.
M W F 11:15.
Foundations of geometry. Various geometric topics, including Euclidean, non-Euclidean; and projective geometry and rigidity theory.

453–454 Introduction to Topology and Geometry 453, fall; 454, spring. 4 credits each term. Prerequisites: Mathematics 411 and 221, or permission of instructor.
M W F 12:20.
Mathematics 453: basic point set topology, connectedness, compactness, metric spaces, fundamental group. Application of these concepts to surfaces such as the torus, the Klein bottle, the Moebius band. Mathematics 454: intrinsic definition of tangent vectors and differential forms in R^n. Metric properties of surfaces in R^3. Smooth manifolds and introduction to Riemannian geometry.

Probability and Statistics

370 Elementary Statistics Spring. 4 credits. Prerequisites: Mathematics 112, 122 or 192; or Mathematics 106 or 108 with permission of instructor. A terminal course for students who will take no further work in this area. Mathematics 370 is not preparation for 472.
Preliminary exams: 7:30 p.m., Feb. 19, March 25, April 22.
Topics in probability that are essential to an understanding of statistics; introduction to the principles underlying modern statistical inference and the rationale underlying choice of statistical methods in various situations.

471 Basic Probability Fall. 4 credits. Prerequisite: Mathematics 221. May be used as a terminal course in basic probability. Intended primarily for those who will continue with Mathematics 472.
Preliminary exams: 7:30 p.m., Oct. 5, Oct. 30, Nov. 27.
Topics covered include combinatorics, important probability laws, expectations, moments, moment generating functions, limit theorems. Emphasis is on diverse applications and on development of use in statistical applications. See also the description of Mathematics 571.

472 Statistics Spring. 4 credits. Prerequisite: Mathematics 471 and knowledge of linear algebra such as taught in Mathematics 221.
Preliminary exams: 7:30 p.m., Feb. 19, March 25, April 22.
Classical and recently developed statistical procedures are discussed in a framework that emphasizes the basic principles of statistical inference and the rationale underlying the choice of these procedures in various settings. These settings include problems of estimation, hypothesis testing, large sample theory.

473 Further Topics in Statistics Fall. 4 credits. Prerequisite: Mathematics 472 or 574. (For corresponding subject matter taught in more detail, see description of Mathematics 573 and 675.)
T R 8:40–9:55.
More detailed discussion of some of the topics not covered at length in Mathematics 472. Design and analysis of experiments. Multivariate analysis. Nonparametric inference; robustness. Sequential analysis.

Mathematical Logic

381 Elementary Mathematical Logic Spring. 4 credits. Prerequisite: Mathematics 122.
M W F 11:15.
Propositional and predicate logic. Completeness and incompleteness theorems. Set theory.

Graduate Courses

Students interested in taking graduate courses in mathematics should consult the department for further course details, times, and possible changes in courses as described below.

511–512 Real and Complex Analysis
First term: measure and integration, functional analysis. Second term: complex analysis, Fourier analysis, and distribution theory.

515–516 Mathematical Methods in Physics 515, fall; 516, spring. 4 credits each. Intended for graduate students in physics or related fields who have had a strong advanced calculus course and at least two years of general physics. A knowledge of the elements of finite dimensional vector space theory, complex variables, separation of variables in partial differential equations, and Fourier series will be assumed. The course overlaps with parts of Mathematics 421–422–423. Undergraduates will be admitted only with permission of instructor.
Mathematics 515 is a prerequisite for 516.
T W R F 12:20.
Topics designed to give a working knowledge of the principal mathematical methods used in advanced physics. A brief discussion of some basic notions: metric space, vector space, linearity, continuity, integration. Generalized functions (Schwartz distributions). Fourier series and Fourier integrals. Saddle point method. Linear operators. Differential operators and integral operators, the equations and eigenvalue problems connected with them and the special functions arising from them. Elements of group theory. The rotation group and its representations.

517–518 Ordinary Differential Equations
Advanced topics in ordinary differential equations.

[519–520 Partial Differential Equations Not offered 1979–80.]

521 Elementary Functional Analysis
Elementary set theory and topology. Banach and Hilbert spaces, measure and integration. Graduate students in mathematics should take Mathematics 613 for functional analysis.

522 Applied Functional Analysis
Spectral theorem for bounded operators, spectral theory for unbounded operators in Hilbert space, compact operators, distributions. Applications.

527 Analysis of Numerical Methods for Partial Differential Equations
Tools for analyzing practical numerical methods, especially with regard to asymptotic convergence. Finite difference and finite element method.

531–532 Algebra
First term: finite groups, field extensions, Galois theory, rings and algebras, tensor and exterior algebra. Second term: Wedderburn structure theorem, Brauer group, group cohomology, Ext, Dedekind domain, primary decomposition, Hilbert basis theorem, local rings. Additional topics selected by instructor.

537 Elementary Number Theory Prerequisite: Mathematics 432. Advanced undergraduates are encouraged to attend.

549 Lie Groups and Differential Geometry

551 Introductory Algebraic Topology
Fundamental group and covering spaces. Homology and cohomology theories for complexes and spaces.

552 Differentiable Manifolds
Manifolds and differentiable structures. Tangent, cotangent, and tensor bundles. Exterior calculus. Riemannian structures. Local and global theory of differential equations. Integration on manifolds.

561 Geometric Topology
Topics from general topology. Introduction to geometric properties of manifolds.

571–582 Probability Theory Prerequisites: a knowledge of Lebesque integration theory, at least on the real line. Students can learn this material by taking parts of Mathematics 413–414 or 521. Properties and examples of probability spaces. Sample space, random variables, and distribution functions. Expectation and moments. Independence, Borel-Cantelli lemma, zero-one law. Convergence of random variables, probability measures, and characteristic functions. Law of large numbers. Selected limit theorems for sums of independent random variables. Markov chains, recurrent events. Ergodic and renewal theorems. Martingale theory. Brownian motion and processes with independent increments.

571–574 Probability and Statistics This course is a prerequisite to all advanced courses in statistics. First term: same as Mathematics 571. Second term: topics include an introduction to the theory of point estimation, consistency, efficiency, sufficiency, and the method of maximum likelihood; the classical tests of hypotheses and their power; the theory of confidence intervals; the basic concepts of statistical decision theory; the fundamentals of sequential analysis. Intended to furnish a rigorous introduction to mathematical statistics.

573 Experimental Design, Multivariate Analysis Rationale for selection of experimental designs and algorithms for constructing optimum designs. Optimum properties and distribution theory for classical analysis of variance procedures and their simplest multivariate analogues.

[575 Sequential Analysis, Multiple Decision Problems Not offered 1979–80.]

581 Logic
Basic topics in mathematical logic including: propositional and predicate calculus; formal number theory and recursive functions; completeness and incompleteness theorems.

611–612 Seminar in Analysis

613 Functional Analysis
Topological vector spaces. Banach and Hilbert spaces. Banach algebras. Additional topics to be selected by instructor.

615 Fourier Analysis

622 Riemann Surfaces

623 Several Complex Variables

627 Seminar in Partial Differential Equations

631–632 Seminar in Algebra

635 Topics in Algebra I
Selection of advanced topics from algebra, algebraic number theory, and algebraic geometry. Course content varies.

[637 Algebraic Number Theory Not offered 1979–80.]

639 Topics in Algebra II
Selection of advanced topics from algebra, algebraic number theory, and algebraic geometry. Course content varies.

[640 Homological Algebra Not offered 1979–80.]

651–652 Seminar in Topology

653–654 Algebraic Topology
Duality theory in manifolds, applications, cohomology operations, spectral sequences, homotopy theory, general cohomology theories, categories and functors.

657–658 Advanced Topology
Selection of advanced topics from modern algebraic, differential, and geometric topology. Course content varies.

[661–662 Seminar in Geometry Not offered 1979–80.]

667 Algebraic Geometry

670 Topics in Statistics
A course taught occasionally to cover special topics in theoretical statistics not treated in other listed courses. Typical of the subjects that will be treated are time series analysis, and classification and cluster analysis. Special topic in spring 1980: Statistical inference in exponential families.

671–672 Seminar in Probability and Statistics

[674 Multivariate Analysis Not offered 1979–80.]

[675–676 Statistical Decision Theory Not offered 1979–80.]

677–678 Stochastic Processes

681–682 Seminar in Logic

[683 Model Theory Not offered 1979–80.]

684 Recursion Theory
Theory of effectively computable functions. Classification of recursively enumerable sets. Degrees of recursive unsolvability. Applications to logic. Hierarchies. Recursive functions of ordinals and higher type objects. Generalized recursion theory.

685 Metamathematics
Topics in metamathematics. Course content varies.

687 Set Theory
Models of set theory. Theorems of Gödel and Cohen, recent independence results.

690 Supervised Reading and Research

Modern Languages, Literatures, and Linguistics

Courses in modern languages, literatures, and linguistics are offered by various departments of the college.

	Department
Akkadian, Arabic, Aramaic	Near Eastern Studies
Chinese literature	Asian Studies
French literature	Romance Studies
Germanic literature	German Literature
Greek	Classics
Hebrew	Near Eastern Studies
Italian literature	Romance Studies
Japanese literature	Asian Studies
Latin	Classics
Russian literature	Russian Literature
Spanish literature	Romance Studies
Swahili	Africana Studies and Research Center

Language, literature, and linguistics courses which are not offered by the departments listed above are offered by the Department of Modern Languages and Linguistics.

Arabic

See listings under Near Eastern Studies.

Burmese

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Burmese 102: 101 or equivalent.
Hours to be arranged. R. B. Jones.
A semi-intensive course for beginners or for those who have been placed in the course by examination. The purpose of the course is to give a thorough grounding in all the language skills: listening, speaking, reading, and writing.

201–202 Burmese Reading 201, fall; 202, spring. 3 credits each term. Prerequisites: for Burmese 201, qualification in Burmese; for 202, Burmese 201.
Hours to be arranged. R. B. Jones.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisites: for Burmese 203, qualification in Burmese; for 204, Burmese 203.
Hours to be arranged. R. B. Jones.

301–302 Advanced Burmese Reading 301, fall; 302, spring. 4 credits each term. Prerequisites: for Burmese 301, Burmese 202 or permission of instructor; for 302, Burmese 301 or permission of instructor.
Hours to be arranged. R. B. Jones.
Selected readings in Burmese writings in various fields.

Cambodian

[101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for 102 is 101 or equivalent. Not offered 1979–80; next offered 1980–81.]

[201–202 Cambodian Reading 201, fall; 202, spring. 3 credits each term. Prerequisites: for Cambodian 201, qualification in Cambodian; for 202, Cambodian 201. Not offered 1979–80; next offered 1980–81.]

[203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisites: for Cambodian 203, qualification in Cambodian; for 204, Cambodian 203. Not offered 1979–80; next offered 1980–81.]

[301–302 Advanced Cambodian 301, fall; 302, spring. 4 credits each term. Prerequisites: for Cambodian 301, Cambodian 201–202 or the equivalent; for 302, Cambodian 301. Not offered 1979–80; next offered 1980–81.]

[401–402 Directed Individual Study 401, fall; 402, spring. For advanced students. 4 credits each term. Prerequisite: permission of instructor. Not offered 1979–80; next offered 1980–81.]

[404 Structure of Cambodian Spring only. 4 credits. Prerequisite: Linguistics 101–102 or the equivalent. Not offered 1979–80; next offered 1980–81.]

Cebuano (Bisayan)

[101–102 Basic Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Cebuano 102: 101 or equivalent. Offered according to demand. A semi-intensive course for beginners. Not offered 1979–80; next offered 1980–81.]

Chinese

Languages and Linguistics

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Chinese 102: 101 or equivalent.
Lec, M W F 9:05; drill, M–F 8 or 2:30. J. McCoy, P. Ni, P. Wang.
A semi-intensive course for beginners or for those who have been placed in the course by examination. The course gives a thorough grounding in all the language skills: listening, speaking, reading, and writing.

111–112 Cantonese Basic Course 111, fall; 112, spring. 6 credits each term. Prerequisite: permission of instructor.
Lec, T R 11:15; drill, M–F 10:10. J. McCoy, S. Fessler.
Conversation in standard Cantonese and readings in modern expository Chinese with Cantonese pronunciation.

201–202 Intermediate Chinese I 201, fall; 202, spring. 4 credits each term. Prerequisite: qualification in Chinese.
M–F 9:05 or 11:15. P. Ni, W. Taylor.

203–204 Chinese Conversation 203, fall; 204, spring. 1 credit each term. S-U grades only. Prerequisite: Chinese 101–102. Two class hours. May be repeated for credit.
M W 1:25. Staff.

211–212 Intermediate Cantonese I 211, fall; 212, spring. 4 credits each term. Prerequisite: Cantonese 112 or permission of instructor.
Hours to be arranged. S. Fessler.

213–214 Introduction to Classical Chinese 213, fall; 214, spring. 3 credits each term. Prerequisite: qualification in Chinese or permission of instructor. This course may be taken concurrently with Chinese 101–102, 201–202, or 301–302.
M W F 10:10. E. M. Gunn, T. L. Mei, D. Perushek.

301–302 Intermediate Chinese II 301 fall; 302, spring. 4 credits each term. Prerequisite for Chinese 301: 202 or equivalent. Prerequisite for Chinese 302: 301.
M W F 11:15. P. Wang.
Readings and drill in modern expository Chinese.

303–304 Chinese Conversation — Intermediate 303, fall; 304, spring. 1 credit each term. S-U grades only. Prerequisites: Chinese 201–202. May be repeated for credit.
T R 1:25. Staff.
Guided conversation and oral composition and translation. Corrective pronunciation drill.

311–312 Intermediate Cantonese II 311, fall; 312, spring. 4 credits each term. Prerequisite: Cantonese 212 or permission of instructor.
Hours to be arranged. S. Fessler.

[401 History of the Chinese Language Fall or spring on student demand. 4 credits. Prerequisite: permission of instructor. Hours to be arranged. J. McCoy. Not offered 1979–80; next offered 1980–81.]

403 Linguistic Structure of Chinese: Phonology and Morphology Fall or spring on student demand. 4 credits. Prerequisite: permission of instructor.
Hours to be arranged. C. Ross.

404 Linguistic Structure of Chinese: Syntax Fall or spring on student demand. 4 credits. Prerequisite: Chinese 403.
Hours to be arranged. C. Ross.

405 Chinese Dialects Fall term on student demand. 4 credits. Prerequisite: permission of instructor.
Hours to be arranged. J. McCoy.

411–412 Readings in Modern Chinese Literature 411, fall; 412, spring. 4 credits each term. Prerequisite: Chinese 302.
M W F 1:25. P. Ni.

607 Chinese Dialect Seminar Fall or spring on student demand. 4 credits. Prerequisite: Chinese 405 and permission of instructor.
J. McCoy.
Analysis and/or field techniques in a dialect area.

FALCON

161–162 Intensive Mandarin Course 161, fall (parallels first 16 credits of instruction in regular program); 162, spring (parallels second 16 credits of instruction in regular program). Prerequisite: permission of instructor.
J. McCoy and staff.

Literature in Chinese

313 Chinese Philosophical Texts Fall. 4 credits. Prerequisite: Chinese 214.
T. L. Mei.

[314 Classical Narrative Texts Spring. 4 credits. Prerequisite: Chinese 214. E. M. Gunn. Not offered 1979–80.]

420 T'ang and Sung Poetry Fall. 4 credits. Prerequisite: permission of instructor.
T. L. Mei.

421–422 Directed Study 421, fall; 422, spring. 2–4 credits each term. Prerequisite: permission of instructor.
Staff.

424 Readings in Literary Criticism Spring. 4 credits. Prerequisite: permission of instructor.

430 Readings in Folk Literature Fall or spring on student demand. 4 credits. Prerequisite: permission of instructor.
J. McCoy.

For complete descriptions of courses numbered 600 or above consult the appropriate instructor.

[603 Seminar in Chinese Poetry and Poetics Fall. 4 credits. Prerequisite: permission of instructor. T. L. Mei. Not offered 1979–80.]

[605 Seminar in Chinese Fiction Fall. 4 credits. Prerequisite: permission of instructor. E. M. Gunn. Not offered 1979–80.]

609 Seminar in Chinese Folk Literature Fall or spring on student demand. 4 credits. Prerequisite: permission of instructor.
J. McCoy.

621–622 Advanced Directed Reading 621, fall; 622, spring. Credit to be arranged. Prerequisite: permission of instructor.
E. M. Gunn, J. McCoy, T. L. Mei.

Dutch

131–132 Reading Course 131, fall; 132, spring. 3 credits each term. Prerequisite: permission of instructor.
Hours to be arranged. F. C. van Coetsem.

Seminar in Dutch Linguistics (German 740)

English as a Second Language

102 English as a Second Language Fall. 6 credits. Prerequisite: placement by the instructor.
M–F 9:05. M. Martin.
Intermediate spoken and written English with emphasis on speaking, understanding, and reading.

103 English as a Second Language Spring. 3 credits. Prerequisite: English 102 or placement by the instructor.
M W F 2:30. M. Martin.
Designed for those who have completed English 102 and who require or desire further practice. Emphasis is on developing control of written as well as spoken language.

211–212 English as a Second Language 211, fall; 212, spring. 3 credits each term. Prerequisite: placement by the instructor.
M W F 11:15 or 2:30. M. Martin.
Advanced reading and writing with emphasis on improving vocabulary and control of college-level written English.

213 English for Non-native Speakers Spring. 3 credits. Prerequisite: placement by the instructor.
T R 10:10; plus a weekly interview. M. Martin.
Designed for those whose writing fluency is sufficient for them to carry on regular academic work, but who feel the desire for refining and developing their ability to express themselves clearly and effectively. As much as possible, students receive individual attention.

Freshman Seminar

215–216 English for Bilinguals 215, fall; 216, spring. 3 credits each term.
M W F 11:15 or 2:30. M. Martin.
A course designed to strengthen the English language skills of students from American high schools whose language in the home is not English. Intensive work in written English is offered, with emphasis on sentence structure, cohesion, vocabulary expansion, maturity of style, and grammatical structure and pronunciation.

French

Languages and Linguistics

121–122 Elementary Course 121, fall; 122, spring. 4 credits each term. Prerequisite for French 122: 121 or equivalent. Intended for beginners or students placed by examination. Students who obtain a CEEB score of 560 after French 121–122 attain qualification and may enter the 200-level sequence; otherwise French 123 is required for qualification.
Lec, R 9:05, 11:15 or 1:25; drill, M T W F 8, 9:05, 10:10, 11:15, 12:20, 1:25, or 2:30. J. Noblitt.
A thorough grounding in all the language skills is given: listening, speaking, reading, and writing. Language practice is in small groups. Lectures cover grammar, reading, and cultural information.

123 Continuing French Fall or spring. 4 credits. Limited to students who have previously studied French and have a CEEB achievement score between 450 and 559. Satisfactory completion of French 123 fulfills the qualification portion of the language requirement.
Lec, T 9:05 or 12:20; drill, M W R F 8, 9:05, 10:10, 11:15, 1:25, or 2:30. J. Herschensohn.
An all-skills course designed as the final course in the sequence. A review of grammar is included in addition to reading, writing, and conversation.

200 Intermediate Course: Language and Literature Fall or spring. 3 credits. Prerequisite: qualification in French with a CEEB achievement score no higher than 629.
Fall: M W F 9:05 or 12:20 or T R 8:40. Spring: M W F 9:05 or 12:20. Romance studies staff.
An introductory examination of modern French culture and literature, based upon reading and discussion of texts which, while carefully graduated in terms of linguistic difficulty, are selected for their cultural and humanistic value. Emphasis is on linguistic and analytical skills.

203 Intermediate Composition and Conversation Fall or spring. 3 credits. Prerequisite: qualification in French.
Lec, T 11:15, 1:25, W 2:30, or R 11:15; drill, M W F 8, 9:05, 10:10, 11:15, 12:20, 1:25, or 2:30.
S. A. Littauer.
Weekly grammar review in addition to composition and conversation.

204 Intermediate Composition and Conversation Fall or spring. 3 credits. Prerequisite: French 203 or equivalent. Enrollment limited.
Fall: lec, T 2:30 or W 1:25; drill: M W F 10:10, 2:30 or 3:35. Spring: lec, T 10:10 or W 1:25; drill: M W F 9:05, 10:10, 11:15, 12:20, or 1:25. S. A. Littauer.
Conversation, compositions, vocabulary expansion, and some grammar review (all based on contemporary texts).

211–212 Intermediate French 211, fall; 212, spring. 3 credits each term. Prerequisite for French 211: qualification. Prerequisite for French 212: French 211, 203, or placement by advanced standing examination. Offered by the Department of Romance Studies.
Fall: M W F 10:10 or 12:20; spring: M W F 11:15 or 12:20. N. Furman and staff.
Designed to improve reading, writing, and speaking skills. Grammar is reviewed. Special emphasis is on vocabulary expansion, composition, and the development of reading competence. Students write short essays in French; readings focus on modern literature and culture.

311–312 Advanced Composition and Conversation 311, fall; 312, spring. 4 credits each term. Prerequisite: French 212 or 204 or placement by special examination. Offered by the Department of Romance Studies.
M W F 10:10 or 1:25. J. Béreaud and staff.
All-skills course. Reading and analysis of contemporary texts. Detailed study of present-day syntax in French 311. Weekly translations or essays in French.

401 History of the French Language Fall. 4 credits. Prerequisites: qualification in French and Linguistics 101.
Hours to be arranged. J. Herschensohn.

407 Applied Linguistics: French Fall. 4 credits. Prerequisite: qualification in French.
M W F 3:35. J. S. Noblitt.
Survey of French phonetics, grammar, and pedagogical techniques.

408 Linguistic Structure of French Spring. 4 credits. Prerequisites: qualification in French and Linguistics 101, or permission of instructor.
M W F 3:35. J. Herschensohn.
A descriptive analysis of present-day French, with emphasis on its phonology, morphology, and syntax.

410 Semantic Structure of French Fall or spring, alternate years. 4 credits. Prerequisite: permission of instructor. Open to undergraduate and graduate students.
Hours to be arranged. L. R. Waugh.

[424 Composition and Style J. Béreaud. Not offered 1979–80.]

[602 Linguistic Structure of Old and Middle French Spring. 4 credits. Prerequisite: French 408 or permission of instructor. Offered in alternate years. Not offered 1979–80; next offered 1981–82.]

[604 Contemporary Theories of French Grammar Fall. 4 credits. Prerequisite: permission of instructor. Not offered 1979–80; next offered in 1980–81.]

700 Seminar in French Linguistics Spring. 4 credits. Offered according to demand.
Hours to be arranged. Staff.
Topic: Current theories of French phonology.

Literature

105 Freshman Seminar: The French Novel Fall. 3 credits.
M W F 12:20. A. Colby-Hall.
Evolution of the French novel from the seventeenth century to the present. Discussion of novels by such writers as Madame de Lafayette, Laclos, Stendhal, Flaubert, Malraux, Sartre, and Robbe-Grillet (readings in English translation).

107 Freshman Seminar: Readings in Modern Literature Fall or spring. 3 credits.
Fall: M W F 9:05; spring: M W F 9:05. Staff.
What sense of modernity is conveyed by literary works of our time that ask what it means to live in a century of world wars and triumphant technology? Representative texts of twentieth-century French literature are discussed in the context of current intellectual and social issues. Works by such writers as Gide, Malraux, Sartre, Ionesco, Genet, and Bataille (readings in English translation).

201 Introduction to French Literature Fall or spring. 3 credits. Prerequisite: qualification. French 201 serves as a prerequisite for all 300-level courses in French literature and is required of all majors. The course is divided into small sections of three types: those conducted in French; those that use more French as the term progresses; those conducted in English. The reading in each section is in French and is the same; students may write their principal papers in English. Relative freedom to change from one section of the course to another is given during the first two weeks.
Fall: M W F 9:05, 10:10, 11:15, or 12:20 or T R 10:10–11:25 or 8:40–9:50. (Tentatively, the sections primarily conducted in English will be M W F 9:05 and 12:20; the sections using both French and English will be M W F 9:05, 10:10, 11:15 and T R 10:10–11:25; the sections primarily conducted in French will be M W F 10:10 and 11:15.) Spring: M W F 11:15 or T R 10:10–11:25. R. Klein and staff.
The work of five or six major French authors from the nineteenth and twentieth centuries are introduced. Stress is on literary analysis and the development of reading skills. The larger historical framework in which French literature is considered as a whole, and more general questions of cultural anthropology, linguistics, sociology, and aesthetics are raised. Readings are chosen from the works of such authors as Baudelaire, Flaubert, Mallarmé, Rimbaud, Proust, Sartre, Malraux, Beckett, and Ionesco.

202 Studies in French Literature Fall or spring. 3 credits. Prerequisite: French 201 or a CEEB achievement score of 650 or more (students with scores in the 560–649 range should see French 200). Required of all majors, but not limited to them. A fee is charged for a number of short texts distributed by the instructor.
Fall: T R 10:10–11:25; spring: M W F 10:10, 11:15, or T R 10:10–11:25. P. Lewis and staff.
Study of the classic literature of seventeenth-century France (Corneille, Racine, Molière, Madame de Lafayette) and its immediate forebears (Montaigne) and successors in the Enlightenment (Voltaire, Rousseau, Diderot, Beaumarchais).

309 Mystery and Nature of Fiction (also Comparative Literature 309) Fall. 4 credits.
M W F 11:15. D. Grossvogel.
Our sense of mystery: how it affects, and is reflected in, our fiction. Main readings: Sophocles, Dostoevsky, Camus, Borges, Kafka, Poe, Robbe-Grillet, Agatha Christie.

323 French Civilization Fall. 4 credits. Prerequisite: proficiency in French. Conducted in French. Typically taken after French 203 or equivalent.
M W F 12:20. J. Béreaud.
Study of contemporary French institutions, culture, and attitudes, with special emphasis on French education.

331 Masterpieces of French Drama I: The Classical Era Fall. 4 credits. Conducted in French.
T R 12:20. P. Lewis.
This course aims both to introduce the student to the history of French theater from the baroque period to the French Revolution and to discuss in detail the interpretations of several major plays. Dramatists whose works will be read include, from the seventeenth century, Corneille, Rotrou, Racine, and Molière, and, from the eighteenth century, Marivaux, Sedaine, Diderot, and Beaumarchais.

332 Masterpieces of French Drama II: The Modern Era Spring. 4 credits. A sequel to French 331.
M W F 10:10. D. Grossvogel.
The history of French theater is followed from Romanticism to the present, with emphasis on theatrical experiments in the twentieth century. Plays to be studied will be chosen from works by such authors as Hugo, Musset, Vigny, Dumas, Claudel, Giraudoux, Cocteau, Sartre, Beckett, Ionesco, Genet.

[334 The Rise of the Novel in France: From Chrétien de Troyes to Rousseau Fall. P. Lewis. Not offered 1979–80; next offered 1980–81.]

[335 The Novel as Masterwork: French Novels from Pre-Romanticism to Symbolism Spring. N. Furman. Not offered 1979–80; next offered 1980–81.]

[336 Experimental and Contemporary French Novels: Subversion of the Novelistic Genre from Diderot to the Present Fall. D. Grossvogel. Not offered 1979–80; next offered 1981–82.]

[337 French Poetry from the Middle Ages to Romanticism Fall. E. Morris. Not offered 1979–80; next offered 1981–82.]

[347 Masterpieces of Medieval Literature Not offered 1979–80.]

[350 Pléiade to Montaigne E. Morris. Not offered 1979–80.]

[368 The Baroque in France A. Seznec. Not offered 1979–80.]

[369 French Classicism P. Lewis. Not offered 1979–80.]

379 Victor Hugo and the Romantic Movement Fall. 4 credits. Conducted in French.
M W F 12:20. N. Furman.
A study of French Romanticism through the works of its most influential poet, dramatist, novelist, and polemicist.

[394 Marx in France R. Klein. Not offered 1979–80.]

419–420 Special Topics in French Literature 419, fall; 420, spring. 2–4 credits each term. Prerequisite: permission of instructor.
Staff.
Guided independent study of specific topics.

429–430 Honors Work in French May be taken without credit or for 4 credits with consent of the adviser. Open to juniors and seniors. See the director of the honors program.
P. Lewis.

447–448 Medieval Literature 447, fall; 448, spring. 4 credits each term. Prerequisite: French 201 or consent of the instructor. First term not prerequisite to the second. Additional hour to be arranged for students entering in the spring without previous training in Old French.
Fall: M W F 9:05; spring: W 1:25–3:25.
A. Colby-Hall.
French 447 deals with the epic and the theater; 448 with the romance and the lyric. Facility in reading Old French and appreciation of these four major genres are the primary goals of this course.

[452 Theater in Sixteenth-Century France Not offered 1979–80.]

[456 Literature and the Arts in Sixteenth-Century France Not offered 1979–80; next offered 1980–81.]

458 Montaigne Spring. 4 credits.
M W F 11:15. Friday classes are devoted to *travaux pratiques*, with undergraduate and graduate students, respectively, meeting in alternate weeks. E. Morris.
Emphasis is on Montaigne's history as a reader and writer and on the attendant growth and inflections of his self-awareness; hence, also, on the invention and refinement of the essay as a literary form. Other topics touched on include Montaigne in his times (public life, travels, religion, the wars) and the influence of Montaigne on such later writers as Pascal and Gide.

461 The Theater of Molière Fall. 4 credits.
R 1:25–3:25. A. Seznec.
While centering upon the interpretation of the plays, the course also devotes some discussion to the evolution of Molière's theater and its relation to social and political issues.

473 Diderot and the Enlightenment Fall. 4 credits.
T 2:15–4:15. D. Brewer.
A study of exemplary writings by Diderot in various areas: the novel, the theater, art criticism, the encyclopedia, aesthetics, and philosophy. Discussion refers to the major themes and problems of the Enlightenment and to the topics of discussion among the *philosophes*.

486 Mallarmé Spring. 4 credits.
R 1:25–3:25. R. Klein.
The course will be targeted upon a few key topics: Mallarmé's Hegelianism *(Igitur)*, the question of the prose poem, and stereography *(Un coup de dés)*. Students will be encouraged to pursue a project of analysis and explication in one of the several major works on the Mallarméan corpus.

[490 French Film and Literature in the Twentieth Century D. Grossvogel. Not offered 1979–80.]

[497 Poetry in France Since Baudelaire
D. Grossvogel. Not offered 1979–80.]

[637 Old French Dialectology A. Colby-Hall. Not offered 1979–80.]

639–640 Special Topics in French Literature
639, fall; 640, spring. 4 credits each term. Required of all new graduate students.
Staff.

644 Medieval Seminar: The Old French Epic
Spring. 4 credits.
T 1:25–3:25. A. Colby-Hall.
Topic: The epic world of Guillaume d'Orange.

[648 Medieval Seminar: La Roman de la Rose
A. Colby-Hall. Not offered 1979–80.]

[664 Types of Critical Performances: The Example of Racinian Criticism P. Lewis. Not offered 1979–80.]

[669 Seventeenth-Century Seminar: Illusion and Representation P. Lewis. Not offered 1979–80.]

[689 Bohemians and Dandies N. Furman. Not offered 1979–80.]

693 The Poetics of Derrida Fall. 4 credits.
M 1:25–3:25. R. Klein.
In two recent essays, "Le Parergon" and "Restitutions," Derrida takes as his starting points two works in the history of aesthetics, two philosophies of art, Kant's *Critique of Judgment*, and Heidegger's celebrated essay, "The Origins of the Work of Art." By examining the concepts of art delineated by these two thinkers, Derrida elaborates other means of thinking out philosophically, indeed critically and historically, such notions as fiction, opus, beauty, pleasure, aesthetics, and the sublime. This course attempts to pinpoint some of the implications of this Derridean project for traditional and contemporary literary criticism.

696 Memory, Creation, and the Novel (also Comparative Literature 596) Spring. 4 credits.
M 1:25–3:25. D. Grossvogel.
Reading Proust through Bergson. Time, memory, psychology, language, and aesthetics, as reflected in the works of the novelist and the philosopher, are considered.

Related Courses in Another Department

Method in Intellectual History (Society for the Humanities 423)

***Madame Bovary* on Trial (Society for the Humanities 424)**

Post-Structuralism (Society for the Humanities 421)

The Marxian Legacy (Society for the Humanities 422)

Germanic Studies

Languages and Linguistics

121–122 Elementary Course 121, fall; 122, spring. 4 credits each term. Prerequisite for German 122: 121 or equivalent. Intended for beginners or students placed by examination. Students who obtain a CEEB score of 560 after German 121–122 attain qualification and may enter the 200-level sequence; otherwise German 123 is required for qualification.
Lec, T 9:05, 11:15, or 2:30; drill, M W R F 8, 9:05, 10:10, 11:15, 12:20, 1:25, or 2:30. W. Harbert.
A thorough grounding in all the language skills is given: listening, speaking, reading, and writing. Language practice is in small groups. Lectures cover grammar, reading, and cultural information.

123 Continuing German Fall or spring. 4 credits. Limited to students who have previously studied German and have a CEEB achievement score between 450 and 559. Satisfactory completion of German 123 fulfills the qualification portion of the language requirement.
Fall: lec, M 2:30; drill, T–F 9:05, 10:10, 11:15, or 12:20. Spring: lec, M 2:30; drill, T–F 10:10 or 12:20. H. L. Kufner and staff.
An all-skills course designed to prepare students for study at the 200 level.

203 Intermediate Composition and Conversation Fall or spring. 3 credits. Prerequisite: qualification in German.
Fall: M W F 9:05, 10:10, 11:15, or 12:20; spring: M W F 10:10 or 1:25. E. Augsberger, G. Valk.

204 Intermediate Composition and Conversation Spring. 3 credits. Prerequisite: German 203 or permission of instructor.
M W F 9:05, 10:10, or 11:15. E. Augsberger, G. Valk.

303–304 Advanced Composition and Conversation 303, fall; 304, spring. 4 credits each term. Prerequisite for German 303: German 204 or equivalent. Prerequisite for German 304: 303 or equivalent.
M W F 11:15 or 1:25. E. Augsberger, G. Valk.
Emphasis is on increasing the student's oral and written command of German. Detailed study of present-day syntax and different levels of style.

401 Introduction to Germanic Linguistics Fall. 4 credits. Prerequisite: Linguistics 101. Offered alternate years.
Hours to be arranged. F. van Coetsem.

402 History of the German Language Spring. 4 credits. Prerequisite: German 204 and Linguistics 101 or permission of instructor. Offered alternate years.
Hours to be arranged. J. Jasanoff and F. van Coetsem.

403 Modern German Phonology Fall. 4 credits. Prerequisites: German 304 or equivalent, and Linguistics 101 or 601 or 111.
Hours to be arranged. F. van Coetsem.
The phonological system of German is viewed from different theoretical approaches.

404 Modern German Syntax Spring. 4 credits. Prerequisites: German 304 or equivalent, and Linguisitcs 101 or 111 or 601.
Hours to be arranged. W. Harbert.
An application of selected theoretical syntactic models to problems in the syntax of modern German.

[405 German Dialectology Fall. 4 credits. Prerequisites: German 304 or equivalent, and Linguistics 101, 111, or 601. Not offered 1979–80; next offered 1981–82.
Hours to be arranged. H. L. Kufner.
Survey of German dialects, the work done at the *Sprachatlas*, and a discussion of modern approaches to dialectology.]

[406 Runology Fall. 4 credits. Prerequisite: German 401. Not offered 1979–80; next offered 1982–83.
Hours to be arranged. F. van Coetsem.
A study of the inscriptions in the older *futhark* and their relevance to historical Germanic linguistics.]

407 Applied Linguistics: German Fall. 4 credits.
M W F 11:15. H. L. Kufner.

[408 Linguistic Structure of German Spring. 4 credits. Prerequisites: German 204 and Linguistics 101, or permission of instructor. H. L. Kufner. Not offered 1979–80; next offered 1981–82.]

For complete descriptions of courses numbered 600 or above, consult the appropriate instructor.

[602 Gothic Spring. 4 credits. Prerequisite: Linguisitics 101. Hours to be arranged. Offered alternate years. Not offered 1979–80; next offered 1980–81.]

603–604 Old Saxon, Old High German, Old Low Franconian, Old Frisian 603, fall; 604, spring. 4 credits each term. Prerequisite: Linguistics 102. Offered alternate years.
Hours to be arranged. F. van Coetsem.

[605 Structure of Old English Fall. 4 credits. Prerequisite: German 401. W. E. Harbert. Not offered 1979–80; next offered 1980–81.]

[606 Topics in Historical Germanic Fall. 4 credits. Prerequisite: German 401. Not offered 1979–80; next offered 1980–81.
Hours to be arranged. F. van Coetsem.
The development of the sound system from Proto-Germanic to its daughter languages.]

[607 Topics in Historical Germanic Morphology Spring. 4 credits. Prerequisite: German 401. Not offered 1979–80; next offered 1980–81.
J. Jasanoff.
The Germanic verbal system and its Indo-European origins.]

[608 Topics in Historical Germanic Syntax
Spring. 4 credits. Prerequisite: German 401. Not offered 1979–80; next offered 1980–81.
W. E. Harbert.
A diachronic and comparative investigation of syntactic processes in the older Germanic languages.]

609–610 Old Norse 609, fall; 610, spring. 4 credits each term.
Hours to be arranged. V. Bjarnar.

[611 Readings in Old High German and Old Saxon Fall. 4 credits. Prerequisite: German 603 and 604. Not offered 1979–80; next offered 1980–81.
J. Jasanoff.
Texts are chosen to suit the interests of students taking the course, but normally include selections from the more extensive Old High German and Old Saxon sources (Otfrid, Tatian, *Heliand*) as well as representative shorter works, such as *Hilderbrandslied, Muspilli*, and *Genesis*.]

[612 Germanic Tribal History Spring. 4 credits. Prerequisite: German 401. Not offered 1979–80; next offered 1980–81.
F. van Coetsem.
The history of the Germanic tribes from about 500 B.C. to 500 A.D. introduces the study of Proto-Germanic, and the separation of the German languages.]

631–632 Elementary Reading I 631, fall; 632, spring. 3 credits each term. Prerequisite for German 632: 631 or equivalent. Limited to graduate students.
M W F 4:30; T R 11:15–12:30. I. Kovary.
Emphasis is on developing skill in reading, although some attention will be devoted to the spoken language, especially to listening comprehension.

710 Seminar in Germanic Linguistics Fall or spring, subject to the needs of students and to the limitations of staff time. 4 credits.
Hours to be arranged. W. Harbert.

720 Seminar in Comparative Germanic Linguistics Fall or spring, subject to the needs of students and to the limitations of staff time. 4 credits.
Hours to be arranged. Staff.

730 Seminar in German Linguistics Fall or spring, subject to the needs of students and to the limitations of staff time. 4 credits.
Hours to be arranged. Staff.

740 Seminar in Dutch Linguistics Fall or spring, subject to the needs of students and to the limitations of staff time. 4 credits.
Hours to be arranged. F. C. van Coetsem.
Selected topics including the history, structure, and dialects of modern Dutch.

Literature

Freshman Seminars

105–106 Masterpieces of German Literature I and II 105, fall; 106, spring. 3 credits each term.
Lec, M 12:20; discussion, W F 12:20. 3 discussion sections meet jointly for lecture. Lectures by department faculty. I. Ezergailis and staff.
Readings will be selected from the Middle Ages, Grimm's Tales, Goethe, the German Romantics, Nietzsche, Freud, Thomas Mann, Rilke, Hesse, Kafka, Brecht, Peter Weiss, Grass, and Böll. All readings in English.

109 Folk Literature and Folk Poetry Fall and spring. 3 credits each term.
M W F 8 or T R 8:30–10 or M W F 10:10. A. Berger and staff.
The study of folk literature, ballads, myths, and other forms of primitive literature. Readings in the Grimm brothers, H. C. Andersen, Old Icelandic mythological texts, saints' lives, Child ballads, and selected secondary literature. All readings in English.

Courses Offered in German

201 Introduction to German Literature I Fall. 3 or 4 credits. Prerequisite: qualification in German or permission of instructor. Taught in German.
M W F 12:20 or T R 12:20–1:35. P. W. Nutting and staff.
An intermediate course designed to improve reading, writing, and speaking skills. Emphasis is placed on developing reading competency, tools of literary analysis, and expansion of vocabulary. Grammar review included. Readings from major twentieth-century authors.

202 Introduction to German Literature II Spring. 3 or 4 credits. Prerequisite: qualification in German or permission of instructor. Taught in German.
M W F 12:20 or T R 12:20–1:35. P. W. Nutting and staff.
Close readings in eighteenth- and nineteenth-century prose, poetry, and drama.

211 Intensive Workshop in Germanic Studies for Freshmen I Fall. 6 credits. Intended for entering freshmen with extensive training in the German language (CEEB achievement score of 680 or comparable evidence; please consult instructor). Taught in German. Satisfies both the language requirement and the distribution requirement. May also be used to fulfill the Freshman Seminar requirement.
T R 2:30–4:30. H. Deinert.
Not intended as a survey but rather as a rigorous seminar designed to familiarize students with literary forms and the tools of critical analysis. The course will provide an intensive introduction to the study of German literature through the discussion of exemplary prose works, dramas, and poems from the eighteenth century to the present.

312 Intensive Workshop in Germanic Studies for Freshmen II Spring. 4 credits. Taught in German. May be used to satisfy the Freshman Seminar requirement.
T R 2:30–4. H. Deinert.
Designed primarily as a sequel to German 211. Emphasis is on modern German literature since 1900 (Thomas Mann, Hesse, Kafka, Grass, Handke, Brecht, Dürrenmatt, Peter Weiss, Rilke, Trakl, Benn, Celan). Supplementary reading from contemporary philosophy, psychology, sociology, and political theory.

305 Modern Germany Fall. 4 credits. Prerequisite: German 304 or equivalent. Taught in German.
T R 10:10–11:25. P. Hohendahl.
Introduction to the history of postwar Germany, the development of the two Germanies, and their societies. The emphasis is on cultural and social institutions such as mass media, educational systems, and political parties. Students will have the opportunity to practice their spoken and written German.

[354 Schiller Not offered 1979–80.]

[355 The Age of Goethe Not offered 1979–80.]

355 Eighteenth-Century Poetry Spring. 4 credits. Prerequisite: German 201 or 202 or permission of instructor.
M W F 10:10. E. A. Blackall.
Types and directions of German poetry of the eighteenth century, theories of poetry, and the study of major poets of the period, with special emphasis on Klopstock, Schiller, Hölderlin, and Goethe's poetry to 1800. Lectures and discussions.

[356 Goethe's *Faust* Not offered 1979–80.]

356 Drama in the Eighteenth Century Fall. 4 credits. Prerequisite: German 201 or 202 or permission of instructor.
M W F 10:10. E. A. Blackall.
Detailed study of selected dramas by Lessing, Goethe, and Schiller with some consideration of the development of drama during the century and the more important theories of drama.

[357 Romanticism Not offered 1979–80.]

359 Origins of Modern Drama Spring. 4 credits. Prerequisite: German 201 or 202 or permission of instructor. Taught in German.
T R 2:30–3:45. P. W. Nutting.
A survey of drama in German from 1805 to World War I. Readings will include works by Kleist, Büchner, Hebbel, Ibsen, Strindberg, Hauptmann, Schnitzler, Wedekind, Kaiser, and the early Brecht.

[360 The German Novelle Not offered 1979–80.]

[361 Modern German Literature I: Contemporary German Prose Not offered 1979–80.]

[362 Modern German Literature II: Twentieth-Century Prose Not offered 1979–80.]

[363 Modern German Literature III: Contemporary Literature Not offered 1979–80.]

[365 Lyrical Poetry Not offered 1979–80.]

Courses in English Translation

311 Modern German Drama in English Spring. 4 credits.
T R 10:10; third class meeting to be arranged.
I. Ezergailis.
An investigation of themes and structures in the work of selected twentieth-century dramatists, following the development of dramatic theory, stage practice, and the relationship between the two. The plays to be read include texts from Brecht, Dürrenmatt, Frisch, Peter Weiss, and Handke.

[313 Thomas Mann Not offered 1979–80.]

[314 Nietzsche, the Man and the Artist Not offered 1979–80.]

315 Topics in German Literature I: The Modern German Novel in English Translation Fall. 2–4 credits. (For details on variable credit, consult the instructor.)
T R 11:15. Third class meeting to be arranged.
H. Deinert.
The spirit of the first half of the century as reflected in prose works of major authors. Emphasis on Hesse *(Siddharta, Demian, Steppenwolf, Narcissus and Goldmund)*; Kafka *(Amerika, The Trial*, the short stories); Rilke *(Malte Laurids Brigge)*; Thomas Mann *(Tonio Kröger, Tristan, Death in Venice)*. Supplementary reading from Dostoevsky, Hamsun, Alain-Fournier, and others.

324 Old Icelandic Literature: Sagas and Eddas Fall. 4 credits.
M W F 12:20. A. J. Berger.
Old Icelandic mythological and heroic poetry, legendary and historical narratives, from pre-Christian times to the fourteenth century, in English translation.

350 Yiddish Literature in English Translation Fall. 4 credits.
T R 12:20–1:35. S. L. Gilman.
An introduction to the literary tradition of Eastern European Jewry. Lectures will cover the historical and sociological contexts of Yiddish literature from the Middle Ages to the present. Readings will concentrate in the tradition of Yiddish letters during the nineteenth and twentieth centuries (Mendele, Sholem Aleichem, Peretz, Asch, I. J. Singer, I. B. Singer). Some consideration will be given to the Yiddish theater and films of major dramas will be screened.

375 The Shtetl in Modern Yiddish Fiction in English Translation (also Near Eastern Studies 375) Fall. 4 credits.
T R 12:20–1:35. S. Slotnick.

The shtetl, or small Jewish town, has always been a central subject of Yiddish fiction. This course will deal with the literary image of the shtetl in prose works from the nineteenth and twentieth centuries. From the earliest literary treatments of the shtetl to the most modern works, its social and economic realities were exaggerated, distorted, and otherwise manipulated by Yiddish writers for a variety of artistic purposes. Beginning with a solid knowledge of the actual shtetl (its social, economic, and political aspects), we will proceed to discuss a series of works which satirize, criticize, idealize, and perform other literary transformations on the reality of the small Jewish town.

377 Topics in Yiddish Literature (also Near Eastern Studies 377) Spring. 4 credits.
Hours to be arranged. S. Slotnick.
Topic to be announced.

[416 Don Juan and Faust Not offered 1979–80.]

Advanced Courses

[405–406 Introduction to Medieval German Literature I and II Not offered 1979–80.]

[427 Baroque Literature Not offered 1979–80.]

[438 Twentieth-Century German Literature Not offered 1979–80.]

451–452 Independent Study 451, fall; 452, spring. 1 to 4 credits each term. Prerequisite: permission of instructor.
Hours to be arranged. Staff.
Extensive reading of texts in addition to regular course work, under the direction of a member of the department.

Seminars

For complete descriptions of courses numbered 600 or above consult the appropriate instructor.

611 Seminar in Old Icelandic Literature I Fall. 4 credits. Prerequisite: German 610 or permission of instructor.
To be arranged. A. J. Berger.
Topic to be announced.

[612 Seminar in Old Icelandic Literature II Not offered 1979–80.]

[623 Seminar in Medieval German Literature I Not offered 1979–80.]

[624 Seminar in Medieval German Literature II Not offered 1979–80.]

[625 The Northern Renaissance and Reformation Not offered 1979–80.]

629 The Enlightenment Spring. 4 credits.
T 1:25–3:25. P. Hohendahl.

[631 From *Wilhelm Meister* to *Buddenbrooks* Not offered 1979–80.]

[632 Goethe's Poetry Not offered 1979–80.]

633 Basic Texts of Romanticism Fall. 4 credits.
M 1:25–3:25. E. A. Blackall.
The emphasis will be on critical texts. Theory of art, poetry, drama, and the novel, with special reference to the Schlegel brothers, Tieck and Wackenroder, Novalis, and selected passages from the Romantic philosophers (especially Fichte and Schelling).

634 The Romantic Novel Spring. 4 credits.
M 1:25–3:25. E. A. Blackall.
Detailed study of several Romantic novels, with reference to the new conception of the genre. Texts by Novalis, Hölderlin, Friedrich Schlegel, Tieck, Hoffmann, Brentano or Arnim, and Eichendorff.

[635 The Backgrounds of German Realism Not offered 1979–80.]

[636 Nineteenth-Century Drama Not offered 1979–80.]

[637 Seminar in Realism: The Novel Not offered 1979–80.]

[638 Twentieth-Century German Literature Not offered 1979–80.]

639 Modern Lyric Poetry Fall. 4 credits.
W 3:35. P. W. Nutting.
Problems of modernism, hermetic language, and disrupted communication; the social function of the lyric; and *leere Transzendenz* will be considered in works by Trakl, Benn, Celan, Nelly Sachs, Bachmann, Huchel, and Bobrowski.

[641 The Postwar German Novel Not offered 1979–80.]

[650 Graduate Seminar in Medieval Literature Not offered 1979–80.]

[682 Seminar on Richard Wagner Not offered 1979–80.]

699 Colloquium on the Teaching of Literature Fall or spring. 1 to 4 credits each term. Open to teaching assistants in the Department of German Literature. Composed of all faculty members and assistants teaching undergraduate courses.
Hours to be arranged. Staff.

753–754 Tutorial in German Literature 753, fall; 754, spring. 1 to 4 credits each term. Prerequisite: permission of instructor. Limited to 3 students.
Hours to be arranged. Staff.
Topics for fall: Thomas Mann (I. Ezergailis); German women writers (I. Ezergailis). Topics for spring: Freud (S. L. Gilman); Rilke (H. Deinert).

Related Courses in Other Departments

Psychoanalysis: An introduction to Psychoanalytic Theory (Comparative Literature 110)

The End of the Austro-Hungarian Monarchy, 1848–1918 (History 352)

A Survey of German History 1890 to the Present (History 358)

The European Novel (Comparative Literature 363–364)

Readings in Modern Poetry (Comparative Literature 391)

Mimesis in Literary Theory and Practice (Comparative Literature 394 and 694)

Introduction to Twentieth-Century Criticism (Comparative Literature 395)

Woman Writers and Self-Consciousness (Comparative Literature 399)

The Application of Recent Work in Structuralism and Rhetoric to the Key Concepts of Weimar Humanism (Society for the Humanities 417–418)

The Marxian Legacy (Society for the Humanities 422)

The Utopian Mind (Comparative Literature 456)

Seminar on Germany 1890–1918 (History 456)

Seminar on Weimar and Nazi Germany 1918–1948 (History 458)

Romanticism: Dialectic and Rhetoric (Comparative Literature 471)

Fiction and Its Doubles (Comparative Literature 488)

Aesthetic Theory of the Frankfurt School (Comparative Literature 495)

Critical Practices: Roland Barthes (Comparative Literature 606)

Literature and History (Comparative Literature 698)

Hermeneutics (Comparative Literature 699)

Modern Greek

See listings under Classics.

Modern Hebrew

See listings under Near Eastern Studies.

Hindi-Urdu

101–102 Hindi-Urdu Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Hindi 102: 101 or equivalent.
M–F 9:05. G. Kelley.
A semi-intensive course for beginners. A thorough grounding in all the language skills is given: listening, speaking, reading, and writing.

201–202 Hindi Reading 201, fall; 202, spring. 3 credits each term. Prerequisite for Hindi 201: qualification in Hindi. Prerequisite for Hindi 202: 201 or permission of instructor.
M W F 10:10. G. Kelley.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisite for Hindi 203: qualification in Hindi. Prerequisite for Hindi 204: 203 or permission of instructor.
Hours to be arranged. G. Kelley.

301–302 Readings in Hindi Literature 301, fall; 302, spring. 4 credits each term. Prerequisite for Hindi 301: Hindi 202. Prerequisite for Hindi 302: 301 or equivalent.
Hours to be arranged. G. Kelley.

303–304 Advanced Composition and Conversation 303, fall; 304 spring. 4 credits each term. Prerequisite for 303: Hindi 204 or equivalent. Prerequisite for Hindi 304: 303 or equivalent.
Hours to be arranged. G. Kelley.

305–306 Advanced Hindi Readings 305, fall; 306, spring. 4 credits each term. Prerequisite for Hindi 305: 202 or equivalent. Prerequisite for 306: 305 or equivalent.
Hours to be arranged. G. Kelley.
Intended for those who wish to do readings in history, government, economics, etc., instead of literature.

[401 History of Hindi Fall or spring. 4 credits. Prerequisite: Hindi 101–102 or equivalent, or Linguistics 102. Not offered 1979–80.]

For complete descriptions of courses numbered 600 and above, consult the appropriate instructor.

700 Seminar in Hindi Linguistics Fall or spring. 3 credits. Prerequisite: permission of instructor.
Hours to be arranged. J. W. Gair, G. B. Kelley.

Indonesian

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Indonesian 102: 101.
M–F 8, plus 2 more hours to be arranged.
J. U. Wolff.
A semi-intensive course for beginners.

201–202 Indonesian Reading 201, fall; 202, spring. 3 credits each term. Prerequisite for Indonesian 201: qualification in Indonesian. Prerequisite for Indonesian 202: 201 or permission of instructor.
Hours to be arranged. J. U. Wolff.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisite for Indonesian 203, qualification in Indonesian. Prerequisite for Indonesian 204: 203 or permission of instructor.
Hours to be arranged. J. U. Wolff.

[300 Linguistic Structure of Indonesian Fall or spring. 4 credits. Prerequisites: Indonesian 101–102 or equivalent, and Linguistics 101. Not offered 1979–80; next offered 1980–81.]

301–302 Readings in Indonesian and Malay 301, fall; 302, spring. 4 credits each term. Prerequisite for 301: Indonesian 201–202 or equivalent. Prerequisite for Indonesian 302: 301.
Hours to be arranged. J. U. Wolff.

303–304 Advanced Indonesian Conversation and Composition 303, fall; 304, spring. 4 credits each term. Prequisite for Indonesian 303: 204; Prerequisite for Indonesian 304: 303 or equivalent.
Hours to be arranged. J. U. Wolff.

401–402 Advanced Readings in Indonesian and Malay Literature 401, fall; 402, spring. 4 credits each term. Prerequisite for Indonesian 401: 302 or equivalent. Prerequisite for Indonesian 402: 401 or equivalent.
Hours to be arranged. J. U. Wolff.

FALCON

161–162 Intensive Course 161, fall; 162, spring. 16 credits each term. Prerequisite: permission of instructor.
M–F, 6 hours per day. J. U. Wolff and staff.

Related Course

Malayo-Polynesian Linguistics (Linguistics 655–656)

Italian

Languages and Linguistics

121–122 Elementary Course 121, fall; 122, spring. 4 credits each term. Prerequisite for Italian 122: 121 or equivalent. Intended for beginners or students placed by examination. Students who obtain a CEEB score of 560 after Italian 121–122 attain qualification and may enter the 200-level sequence; otherwise Italian 123 is required for qualification.
Lec, T 10:10; drill, M W R F 8, 9:05, 12:20, 1:25, or 2:30. C. Rosen and staff.
A thorough grounding is given in all the language skills: listening, speaking, reading, and writing. Language practice is in small groups. Lectures cover grammar, reading, and cultural information.

123 Continuing Italian Fall. 4 credits. Limited to students who have previously studied Italian and have a CEEB achievement score between 450 and 559. Satisfactory competion of Italian 123 fulfills the qualification portion of the language requirement.
M–F 2:30. C. Rosen and staff.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisite for Italian 203: qualification in Italian. Prerequisite for Italian 204: 203 or equivalent.
T R 10:10–11:25. C. Rosen and staff.
Guided conversation, composition, reading, pronunciation, and grammar review emphasizing the development of accurate and idiomatic expression in the language.

Note: Students placed in 200-level courses also have the option of taking courses in introductory literature; see separate listings under Italian 200, 201, and 202 for descriptions of these courses, any of which may be taken concurrently with the 203–204 language courses described above. The introductory literature courses are offered by the respective literature departments and the 203–204 language courses by the Department of Modern Languages and Linguistics.

[300 Advanced Composition and Conversation Spring. 2 credits. Prerequisite: Italian 204. Not offered 1979–1980; next offered 1980–1981.]

[402 History of Italian Language Spring. 4 credits. Prerequisites: qualification in Italian and Linguistics 101 or permission of instructor. Offered alternate years. Not offered 1979–80; next offered 1980–81.]

[403 Structure of Italian Fall. 4 credits. Prerequisites: Linguistics 102 and qualification in any Romance language. Offered alternate years. Not offered 1979–80; next offered 1980–81.]

[700 Seminar in Italian Linguistics Offered according to demand. 4 credits. Not offered 1979–80.]

Literature

201 Introduction to Modern Italian Literature Fall. 3 credits. Required of all majors in Italian. May be used to fulfill the distribution requirement. Graduate students may take the course on an S-U basis to fulfill area examination requirements. Prerequisite: reading knowledge of Italian, or knowledge of another Romance language and permission of instructor.
M W 10:10. A. Grossvogel.
Classes are devoted to literature from the Middle Ages through the seventeenth century. Some focus is on language instruction.

202 Introduction to Modern Italian Literature Spring. 3 credits. Conducted in Italian.
M W F 10:10. Staff.
Works in Italian literature from the eighteenth century to the present will be read and discussed, with emphasis on the major authors of the twentieth century.

322 Italian Civilization Fall. 4 credits. Conducted in Italian.
T R 10:10. A. Grossvogel.
Two generations view their lives, culture, and institutions from different points of the social structure in Italy today. The course materials include taped interviews, texts of contemporary writers, films, and slides.

327–328 Dante: *La Divina Commedia* (also Italian 527–528) 327, fall; 328, spring. 4 credits.
W 2:30. G. Mazzotta.
The course will study medieval doctrines. Focus is on some critical questions (such as politics, history, language, and exile) that the *Divine Comedy* poses.

[334 Dante in Translation (also Comparative Literature 344) G. Mazzotta. Not offered 1979–80.]

336 Boccaccio Fall. 4 credits. Conducted in English.
M W 12:20. G. Mazzotta.
Critical investigation, focusing on the *Decameron*, *Filostrato*, and *Teseida*, of some crucial topics such as nature, love, typology, mimesis within their appropriate medieval background.

[359–360 The Italian Renaissance Not offered 1979–80.]

[366 Seventeenth-Century Prose A. Grossvogel. Not offered 1979–80.]

[370 Eighteenth-Century Thought A. Grossvogel. Not offered 1979–80.]

[381 Verga, Svevo, and Pirandello A. Grossvogel. Not offered 1979–80.]

[387 Nineteenth-Century Poetry: Leopardi A. Grossvogel. Not offered 1979–80.]

[390 Contemporary Narrative in Italy A. Grossvogel. Not offered 1979–80.]

395 Twentieth-Century Prose: Contemporary Italian Short Fiction Fall. 4 credits. Readings and discussion in Italian.
T R 12:20. A. Grossvogel.
The course will include a sampling of Verga's, D'Annunzio's, and Pirandello's short stories, and analysis of the short fiction of Buzzati, Landolfi, Moravia, Calvino, Ginzburg, Sanguineti, and Lucentini. An attempt will be made to determine why modern Italian fiction tends toward an abbreviated form.

419–420 Special Topics in Italian Literature 419, fall; 420, spring. 2–4 credits each term. Prerequisite: permission of instructor.
Staff.
Guided independent study of specific topics.

437 Petrarch: *Canzoniere* Spring. 4 credits. Conducted in English.
M W 12:20–1:35. G. Mazzotta.
The seminar focuses on the *Canzoniere* and explores a series of problems proper to the lyric (self, language of the will, music).

[472 Eighteenth-Century Theater A. Grossvogel. Not offered 1979–80.]

[486 The Nineteenth-Century Novel A. Grossvogel. Not offered 1979–80.]

496 Futurism in Italy Spring. 4 credits.
T 1:25. A. Grossvogel.
The narrative, poetry, and poetics of the movement in the context of its opposition to *decadentismo*. The literary production of the futurists will be considered within the wider scope and resonance of the concomitant manifestations in the visual arts. The writings of D'Annunzio, Marinetti, Palazzeschi, Lucini, and Campana will be studied.

498 Contemporary Poetry Spring. 4 credits.
T R 10:10. A. Grossvogel.
An introduction to contemporary Italian poetry. Readings from the poetry of Ungaretti, Montale, Quasimodo, Saba, and Zanzotto.

527–528 Special Topics in the *Divine Comedy* 527, fall; 528, spring. 4 credits.
W 2:30. G. Mazzotta.
For course description, see Italian 327–328 above. Special topics are offered for graduate students.

[559–560 The Italian Renaissance Not offered 1979–80.]

[590 Contemporary Narrative in Italy (also Italian 390) Not offered 1979–80.]

639–640 Special Topics in Italian Literature 639, fall; 640, spring. 4 credits each term.
Staff.

Japanese

Languages and Linguistics

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Japanese 102: 101 or equivalent. Intended for beginners or for those who have been placed in the course by examination.
Lec, M W F 10:10; drill, M–F 9:05 or 12:20. E. H. Jorden and staff.
A thorough grounding is given in all the language skills: listening, speaking, reading, and writing.

123 Accelerated Introductory Japanese Fall. 6 credits. Prerequisite: permission of instructor.
Lec, M W F 10:10 (with Japanese 101–102); drill, M W F 12:20. E. H. Jorden and staff.
Accelerated training in listening, speaking, reading, and writing for students who have already acquired a limited facility in Japanese through residence in Japan or brief formal study, but who require additional training to qualify for admission to Japanese 102.

201–202 Intermediate Japanese I 201, fall; 202, spring. 3 credits each term. Prerequisite for Japanese 201: 102 or equivalent. Prerequisite for Japanese 202: 201 or equivalent.
Lec, M W R 1:25; drill, W 9:05. E. H. Jorden and staff.
Reading of elementary texts with emphasis on expository style.

203–204 Japanese Conversation 203, fall; 204, spring. 4 credits each term. Prerequisite for Japanese 203: 102 or equivalent. Prerequisite for Japanese 204: 203 or 205 or equivalent.
Lec, M W 1:25 (with Japanese 201–202); drill, M T R F 9:05 (with Japanese 205–206). E. H. Jorden and staff.
Training in listening and speaking for students who have already acquired a basic oral proficiency.

205–206 Intermediate Japanese I and Conversation 205, fall; 206, spring. 6 credits each term. Prerequisite for Japanese 205: 102 or equivalent. Prerequisite for Japanese 206: 205 or equivalent.
Lec, M W R 1:25; drill, M–F 9:05. E. H. Jorden and staff.
A combination of Japanese 201–202 and 203–204, for students interested in developing both written and oral skills.

301–302 Intermediate Japanese II 301, fall; 302, spring. 4 credits each term. Prerequisite for Japanese 301: 202 or 206 or equivalent. Prerequisite for Japanese 302: 301 or equivalent.
M W F 2:30. E. H. Jorden and staff.
Reading of selected modern texts with emphasis on expository style.

303–304 Communicative Competence—Intermediate 303, fall; 304, spring. 3 credits each term. Prerequisite for Japanese 303: 204 or 206 or equivalent. Prerequisite for Japanese 304: 303 or equivalent. May be repeated for credit.
Hours to be arranged. E. H. Jorden and staff.
Drill in the use of spoken Japanese within the constraints set by a sampling of Japanese social settings.

401–402 Advanced Japanese 401, fall; 402, spring. 4 credits each term. Prerequisite for Japanese 401: 302 or equivalent. Prerequisite for Japanese 402: 401 or equivalent.
M W F 2:30. E. H. Jorden and staff.
Reading of selected modern texts with emphasis on expository style.

[404 Linguistic Structure of Japanese Spring. 4 credits. Prerequisites: Japanese 102 or permission of instructor, and Linguistics 101. Not offered 1979–80; next offered 1980–81.]

407–408 Oral Narration and Public Speaking 407, fall; 408, spring. 2 credits each term. Prerequisite: Japanese 304 or permission of instructor.
Hours to be arranged. E. H. Jorden and staff.
Instruction in storytelling, lecturing, and speechmaking, with emphasis on both the construction of the discourse and Japanese patterns of oral delivery.

421–422 Directed Readings 421, fall; 422, spring. Credit to be arranged. Prerequisite: permission of instructor.
Hours to be arranged. Staff.
Topics are selected on the basis of student needs.

FALCON

161–162 Intensive Japanese 161, fall; 162, spring. 16 credits each term. Prerequisite: permission of instructor.
M–F, six hours each day. E. H. Jorden and staff.

Literature in Japanese

305–306 Introduction to Literary Japanese 305, fall; 306, spring. 4 credits each term. Prerequisite for Japanese 305: 302 or Japanese 162 or equivalent. Prerequisite for Japanese 306: 305 or equivalent.
T R 1:25–2:15, plus one hour to be arranged.
B. deBary.

405–406 Intermediate Literary Japanese 405, fall; 406, spring. 4 credits each term. Prerequisite for Japanese 405: 306 or 402 or equivalent. Prerequisite for Japanese 406: 405 or equivalent.
T R 1:25–2:15, plus one hour to be arranged.
K. Brazell.

421–422 Directed Readings 421, fall; 422, spring. Credit to be arranged. Prerequisite for Japanese 421: 402 or equivalent. Prerequisite for Japanese 422: 421 or equivalent.
Hours to be arranged. Staff.
Topics are selected on the basis of student needs.

For complete descriptions of courses numbered 600 or above consult the appropriate instructor.

611 Seminar in Modern Literature Fall. 2 or 4 credits. Prerequisite: permission of instructor.
Hours to be arranged. B. deBary.

612 Seminar in Classical Literature Spring. 2 to 4 credits. Prerequisite: permission of instructor.
Hours to be arranged. K. Brazell.

621–622 Advanced Directed Readings 621, fall; 622, spring. Credit to be arranged. Prerequisite: permission of instructor.
Hours to be arranged. Staff.

See courses listed under Department of Asian Studies for Japanese literature courses in translation.

Javanese

131–132 Elementary Course 131, fall; 132, spring. 3 credits each term. Prerequisite for Javanese 131: qualification in Indonesian. Prerequisite for Javanese 132: Javanese 131 or equivalent.
Hours to be arranged. J. U. Wolff.
An elementary language course for those who have had no previous experience in the language.

133–134 Intermediate Course 133, fall; 134, spring. 3 credits each term. Prerequisite for Javanese 133: 132 or equivalent. Prerequisite for Javanese 134: 133 or equivalent.
Hours to be arranged J. U. Wolff.

Old Javanese (see Linguistics 651–652)

Linguistics

101–102 Theory and Practice of Linguistics 101, fall; 102, spring. 4 credits each term.
M W F 9:05. H. L. Kufner.
An introductory course designed primarily for those who intend to major in a language or in general linguistics. (See Linguistics 111–112 for a course designed for nonmajors.)

[111–112 Themes in Linguistics 111, fall; 112, spring. 4 credits each term. Linguistics 111 has no prerequisites. Prerequisite for Linguistics 112: 111 (or, with permission of instructor, 101). Intended primarily for nonmajors. (Linguistics 101–102 designed for majors in language or linguistics.) Not offered 1979–80; next offered 1980–81.]

201 Phonetics Fall. 3 credits.
T R 12:20–1:35. J. S. Noblitt.
Practical and theoretical aspects of phonetics.

[202 Instrumental Phonetics Spring. Not offered 1979–80; next offered 1980–81.]

[244 Sex Roles and Linguistic Behavior (also Women's Studies 244) Spring. 4 credits. Prerequisites: Linguistics 101 or Psych 215, or permission of instructor. Not offered 1979–80; next offered 1980–81.]

302 Multilingual Societies and Cultural Policy Spring. 4 credits.
T R 2:30–4. D. F. Solá.
An analysis of the impact of bilingualism and biculturalism on society, particularly in education and the communication arts. Biculturalism is considered from the perspective of various social sciences. The "flexible-technology" model is used to suggest a method of evaluating policy and program alternatives in the United States and selected other countries.

303 Phonology Fall. 4 credits. Prerequisite: Linguistics 101.
T R 2:30–3:45. C. F. Hockett.
A general survey of neo-Bloomfieldian and Jakobsonian phonology.

304 Morphology Spring. 4 credits. Prerequisite: Linguistics 303 or permission of instructor.
T R 2:30–3:45. Staff.
A general survey of generative phonology and neo-Bloomfieldian, Jakobsonian, and generative morphology.

306 Functional Syntax Spring. 4 credits. Prerequisite: Linguistics 102 or permission of instructor.
M W F 10:10. D. F. Solá.
A general survey of function-oriented syntactic theory and method.

[308 Dialectology Spring. 4 credits. Offered alternate years. Not offered 1979–80; next offered 1980–81.]

311–312 The Structure of English 311, fall; 312, spring. 4 credits each term. Prerequisite for Linguistics 311: 102 or permission of instructor. Prerequisite for Linguistics 312: 311 or permission of instructor.
M W F 11:15. S. McConnell-Ginet.
Linguistics 311 provides an overview of the structure of English, concentrating on the facts of the language as dealt with in various descriptions and treatments, drawing upon whatever theoretical approaches are relevant. 312 deals with special problems of English structure and semantics in a more detailed and advanced fashion.

313 English for Teachers of English Fall. 4 credits. Prerequisites: for undergraduate majors, Linguistics 101–102 or equivalent; for non-linguistics

majors, permission of the instructor; for graduate students, concurrent registration in Linguistics 601.
T R 12:20–1:50. M. Martin.
A course in modern English for current or prospective teachers of English to non-native speakers. A practical analysis of the phonetics, grammar, and semantics of the language in terms that are applicable to both classroom teaching and materials development.

314 Teaching English as a Second Language Spring. 4 credits. Prerequisites: Linguistics 102 (may be taken concurrently); Linguistics 313 or permission of instructor.
T R 2:30–4. M. Martin.
The methods and techniques used in the teaching of English language skills to non-native speakers are considered. Attention is given to materials design as well as to current issues and new trends in the field.

318 Style and Language Spring. 4 credits. Prerequisite: Linguistics 101 or permission of instructor.
T R 8:30–9:45. G. M. Messing.
The many areas where linguistics impinges on style, such as sound symbolism, stylostatistics, metrics, grammaticality and deviation, speech registers, ambiguity, and context parameters are covered.

[341 India as a Linguistic Area Fall. 4 credits. Prerequisite: Linguistics 102 or permission of instructor. J. W. Gair, G. B. Kelley. Offered alternate years. Not offered 1979–80; next offered 1980–81.]

[400 Language: A Functional and Semiotic System Spring. 4 credits. Prerequisite: Linguistics 101 and one other course in linguistics or permission of the instructor. L. R. Waugh. Not offered 1979–80; next offered 1980–81.]

[401 Language Typology Fall. 4 credits. Prerequisite: Linguistics 304. C. F. Hockett. Not offered 1979–80; next offered 1980–81.]

402 Contrastive Analysis Spring. 4 credits. Prerequisite: permission of instructor.
M W F 11:15. H. L. Kufner.
General introduction to contrastive analysis including possible methodologies; range of application to phonological, syntactic, and semantic problems (especially in regard to compulsory categories), and relevance to teaching English as a second language.

403 Applied Linguistics and Second Language Acquisition Spring. 4 credits. Prerequisite: a course in structure of a language at 400 level.
T R 2:30–3:45. J. S. Noblitt.
Examination of the theoretical bases of applied linguistics including current language-teaching methodologies.

[404 Comparative Methodology Fall. 4 credits. Prerequisite: Linguistics 303. R. B. Jones, Jr. Offered alternate years. Not offered 1979–80; next offered 1980–81.]

[405–406 Sociolinguistics 405, fall; 406, spring. 4 credits each term. Prerequisites: Linguistics 101–102 or Linguistics 111–112 or permission of instructor. Linguistics 405 is not a prerequisite to 406. Not offered 1979–80; next offered 1980–81.]

410 Historical Linguistics: Methods and Approaches Fall. 4 credits. Prerequisite: Linguistics 102 or permission of instructor.
Hours to be arranged. J. Jasanoff.
General introduction to historical linguistics including methods and approaches, issues, and applications.

411–412 Transformational Grammar: Syntax and Semantics 411, fall; 412, spring. 4 credits each term. Prerequisite for Linguistics 411: 102. Prerequisite for Linguistics 412: 411.
T 10:10–11:00, R 10:10–11:50. Fall, W. Harbert; spring, J. Bowers.
Linguistics 411 introduces the theory of syntax within a generative-transformational framework. 412 is an advanced course on syntax and the relation of syntax to semantics.

413–414 Generative Phonology 413, fall; 414, spring. 4 credits each term. Prerequisite for Linguistics 413: 102. Prerequisite for Linguistics 414: 413. Offered alternate years.
M W F 1:25. Fall, J. Herschensohn; spring, J. Bowers.
Linguistics 413 introduces phonology within a generative-transformational framework. 414 is an advanced course in generative phonology.

415–416 Social Functions of Language 415, fall; 416, spring. 4 credits each term. Prerequisites: Linguistics 101 or 111 or permission of instructor.
Hours to be arranged. G. B. Kelley
The function of language in society; social constraints on linguistic behavior.

417 History of the English Language Fall. 4 credits. Prerequisite: permission of instructor.
M W F 1:25. G. B. Kelley.
A survey of Old and Middle English dialects; development of modern English; external history; the English language in America.

[440 Dravidian Structures Fall or spring according to demand. 4 credits. Prerequisite: Linguistics 102. G. B. Kelley. Not offered 1979–80; next offered 1980–81.]

[442 Indo-Aryan Structures Fall or spring according to demand. 4 credits. Prerequisite: Linguistics 102. J. W. Gair. Not offered 1979–80; next offered 1980–81.]

493 Honors Thesis Research Fall. 4 credits. May be taken before or after Linguistics 494 or may be taken independently.
Staff.

494 Honors Thesis Research Spring. 4 credits. May be taken as a continuation of or before Linguistics 493.
Staff.

For complete information on courses numbered 600 or above, consult the appropriate instructor.

600 Field Methods Spring. 4 credits. Prerequisites: Linguistics 101 or 201.
Hours to be arranged. J. U. Wolff.

601–602 Proseminar: Introduction to Graduate Study 601, fall; 602, spring. 4 credits each term. Required of entering graduate students majoring in general linguistics. Open to those minoring in linguistics or majoring or minoring in the linguistics of specific languages by permission of instructor.
M W F 10:10. J. W. Gair.
A survey of the major subareas of linguistics. Emphasis is on basic concepts, current issues and their backround, and methodology, with discussions and data-oriented problems based on extensive readings.

603 History of Linguistics Fall. 4 credits.
T R 12:20–1:35. G. M. Messing.
The history of linguistics from early Greek and Sanskrit grammarians to the modern period.

[607 Schools of Linguistics Spring. 4 credits. Prerequisites: Linguistics 102 and permission of instructor. J. E. Grimes. Not offered 1979–80; next offered 1980–81.]

608 Discourse Analysis Spring. 4 credits. Prerequisite: permission of instructor. J. E. Grimes. Not offered 1979–80; next offered 1980–81.]

610 Topics in Transformational Grammar Fall and spring. 3 credits. Prerequisite: permission of instructor.
Fall: M W 3:35, L. Babby. Spring: hours to be arranged, J. Bowers.
Topic for fall 1979: Theme-rheme and its relation to linguistic structure. Spring topic to be announced.

[621–622 Hittite 621, fall; 622, spring. 4 credits each term. Prerequisite for Linguistics 621: permission of instructor. Prerequisite for Linguistics 622: 621 or permission of instructor. J. Jasanoff. Not offered 1979–80; next offered 1980–81.]

[631–632 Comparative Indo-European Linguistics 631, fall; 632, spring. 4 credits each term. Prerequisite for Linguistics 631: permission of instructor. Prerequisite for Linguistics 632: 631 or permission of instructor. J. Jasanoff. Not offered 1979–80; next offered 1980–81.]

640 Elementary Pali Offered either term according to demand. 3 credits.
Hours to be arranged. J. W. Gair.

641–642 Elementary Sanskrit 641, fall; 642, spring. 3 credtis each term. Prerequisite for Linguistics 642: 641.
Hours to be arranged. Fall, G. Messing; spring, J. Jasanoff.

[651–652 Old Javanese Fall or spring according to demand. 4 credits each term. J. U. Wolff. Not offered 1979–80; next offered 1980–81.]

653–654 Seminar in Southeast Asian Linguistics 653, fall; 654, spring. 4 credits each term. Prerequisite: Linguistics 303 or permission of instructor. Linguistics 653 is not a prerequisite for 654.
Hours to be arranged. R. B. Jones, Jr.

[655–656 Malayo-Polynesian Linguistics 655, fall; 656, spring. 4 credits each term. Prerequisites for Linguistics 655: 102 and permission of instructor. Prerequisite for Linguistics 656: 655. J. U. Wolff. Not offered 1979–80; next offered 1980–81.]

[657–658 Seminar in Austro-Asiatic Linguistics 657, fall; 658, spring. 4 credits each term. Prerequisites: Linguistics 102 and permission of instructor. F. E. Huffman. Not offered 1979–80; next offered 1980–81.]

672 Comparative Slavic Linguistics Spring. 4 credits. Prerequisite: permission of instructor. Offered alternate years.
Hours to be arranged. E. W. Browne

700 Seminar Fall or spring according to demand. Credit to be arranged. Prerequisite: permission of instructor.
Hours to be arranged. Staff.
Each year there are about six 700 seminars offered on special topics. Among the topics covered in the past few years were Introduction to the Structure of Turkish, Babby; Subject and Topic, Babby; Meaning-Text Model of Language, Babby; Montague Grammar, McConnell-Ginet; Formal Semantics of Natural Languages, McConnell-Ginet; Speech Synthesis, Grimes; Semantics and Lexicography, Grimes; West African Comparative Linguistics, Grimes; Experimental Course in Huichol, Grimes; Language Variation and Limits to Communication, Grimes; Linguistic Computation, Grimes; The Meaning-Text Model and the Lexicon, Grimes; Relative Clauses, Harbert; Classical and Autonomous Phonology, Hockett; Japanese Sociolinguistics, Jorden; Sociolinguistics and Language Pedagogy, Jorden; Linguistics and the Preparation of Language Teaching Materials, Jorden; Relational Grammar, Rosen; The Semantic Structure

of Language, Waugh; Semantics and Semiotics, Waugh; Semantics of French, Waugh; and many seminars on the linguistics of particular areas, such as Asian, Romance, Germanic, and Slavic.

Seminars are offered according to faculty interest and student demand. Seminars tentatively planned for the coming year are: Relative Clauses, E. W. Browne; Semantics, McConnell-Ginet; Research on Teaching English as a Second Language, S. McConnell-Ginet; Old Texts in Indo-European Languages, J. Jasanoff; Existential Sentences, M. Suñer.

701–702 Directed Research

751 Thai Dialectology Fall. 4 credits. Prerequisites: Linguistics 303 and permission of instructor.
Hours to be arranged. R. B. Jones.

752 Comparative Thai Spring. 4 credits. Prerequisites: Linguistics 404 or equivalent and permission of instructor.
Hours to be arranged. R. B. Jones.

753 Tibeto-Burman Linguistics Fall. 4 credits. Prerequisites: Linguistics 404 or equivalent and permission of instructor.
Hours to be arranged. R. B. Jones.

Pali

See **Linguistics 640.**

Polish

[131–132 Elementary Course 131, fall; 132, spring. 3 credits each term. Prerequisite for Polish 132: 131 or equivalent. Not offered 1979–80; next offered 1980–81.]

[133–134 Elementary Course II 133, fall; 134, spring. 3 credits each term. Prerequisite for Polish 134: 133 or equivalent. Not offered 1979–80; next offered 1980–81.]

Portuguese

121–122 Elementary Course 121, fall; 122, spring. 4 credits each term. Intended for beginners or those who have been placed in course by examination. Students may attain qualification upon completion of 122 by achieving a satisfactory score on a special examination.
Lec, W 12:20; rec, M T R F 12:20 or 1:25.
L. D. King and staff.
A thorough grounding is given in all the language skills: listening, speaking, reading, and writing.

203–204 Intermediate Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisite for Portuguese 203: qualification in Portuguese. Prerequisite for Portuguese 204: 203 or permission of instructor.
M W F 10:10. L. D. King and staff.
Conversational grammar review with special attention to pronunciation and the development of accurate and idiomatic oral expression. Includes readings in contemporary Portuguese and Brazilian prose and writing practice.

[303–304 Advanced Composition and Conversation 303, fall; 304, spring. 4 credits each term. Prerequisite for Portuguese 303: 204 or equivalent. Prerequisite for Portuguese 304: 303 or equivalent. Not offered 1979–80; next offered 1980–81.]

305–306 Readings in Luso-Brazilian Culture 305, fall; 306, spring. 4 credits each term. Prerequisites: Portuguese 204 or equivalent or permission of instructor. Offered alternate years.
M W F 12:20. L. D. King.

700 Seminar in Portuguese Linguistics Spring according to demand. 4 credits.
L. D. King.

Quechua

131–132 Elementary Course 131, fall; 132, spring. 3 credits each term. Prerequisite: qualification in Spanish.
M W F 11:15. D. F. Solá.
A beginning conversation course in the Cuzco dialect of Quechua.

133–134 Intermediate Course 133, fall; 134, spring. 3 credits each term. Prerequisite for Quechua 133: 131–132 or equivalent. Prerequisite for Quechua 134: 133 or equivalent.
Hours to be arranged. D. F. Solá.
An intermediate conversation and reading course. Study of the Huarochiri manuscript.

700 Seminar in Quechua Linguistics Fall or spring. Credit to be arranged. Prerequisite: permission of instructor.
Hours to be arranged. D. F. Solá.

Romance Studies

Language and Linguistics

[321–322 History of the Romance Languages 321, fall; 322, spring. 4 credits each term. Prerequisite for Romance Studies 322: 321. Offered alternate years. Not offered 1979–80; next offered 1980–81.]

323–324 Comparative Romance Linguistics 323, fall; 324, spring. 4 credits each term. Prerequisite for Romance Studies 324: 323.
Hours to be arranged. C. Rosen.
Basic characteristics of the Romance language family. Salient features of eight Romance languages. Broad and localized trends in phonology, syntax, and the lexicon. Elements of dialectology.

[620 Area Topics in Romance Linguistics Spring. 4 credits. May be repeated for credit. Not offered 1979–80; next offered 1980–81.]

[621 Problems and Methods in Romance Linguistics Spring. 4 credits. Not offered 1979–80; next offered 1981–82.]

[622 Romance Dialectology Spring. 4 credits. Offered every third year. Not offered 1979–80.]

Related Course Offered in Another Department

Vulgar Latin (Classics 423)

Literature

309 Mystery and Nature of Fiction (also Comparative Literature 309) Fall. 4 credits.
M W F 11:15. D. Grossvogel.
How our sense of mystery affects and is reflected in our fiction. Readings are taken from Sophocles, Dostoevsky, Camus, Borges, Kafka, Poe, Robbe-Grillet, Agatha Christie.

[355 The Picaresque Novel in a European Perspective (also Comparative Literature 355) Not offered 1979–80.]

[359 Being, God, and Mind: The Key Concepts of European Thought from Plato to Vico (also Comparative Literature 359) Not offered 1979–80.]

693 The Poetics of Derrida Fall. 4 credits.
M 1:25–3:25. R. Klein.
In two recent essays, "Le Parergon" and "Restitutions," Derrida takes as his starting points two works in the history of aesthetics, two philosophies of art, Kant's *Critique of Judgment*, and Heidegger's celebrated essay, "The Origins of the Work of Art." By examining the concepts of art delineated by these two thinkers, Derrida elaborates other means of thinking out philosophically, indeed critically and historically, such notions as fiction, opus, beauty, pleasure, aesthetics, and the sublime. This course attempts to pinpoint some of the implications of this Derridean project for traditional and contemporary literary criticism.

699 Ortega Y Gasset's *The Dehumanization of Art and Ideas on the Novel* (1925) (also Comparative Literature 690) Spring. 4 credits. Conducted in Spanish.
R 2:25–4:25. C. M. Arroyo.
Analysis of the text and incorporation into the European aesthetics of its time, which ranged from Marinette to Malraux's *Voices of Silence*.

Romanian

[131–132 Elementary Course 131, fall; 132, spring. Offered according to demand. 3 credits. Prerequisite for Romanian 132: 131 or equivalent. S. Huffman. Not offered 1979–80; next offered 1980–81.]

[133–134 Elementary Course II 133, fall; 134, spring. Offered according to demand. 3 credits. Prerequisite for Romanian 134: 133 or equivalent. S. Huffman. Not offered 1979–80; next offered 1980–81.]

Russian

Languages and Linguistics

101–102 Elementary Courses 101, fall; 102, spring. 6 credits each term. Prerequisite for Russian 102: 101 or equivalent. Intended for beginners or students placed by examination and those who wish to obtain qualification within two semesters or who wish to enter the 200-level sequence the following fall semester.
Lec, M W 2:30 or T R 11:15; drill, M–F 8, 9:05, 12:20, or 1:25. R. L. Leed and staff.
A thorough grounding is given in all the language skills: listening, speaking, reading, and writing. Language practice is in small groups. Lectures cover grammar, reading, and cultural information.

121–122 Elementary Course 121, fall; 122, spring., 4 credits each term. Prerequisite for Russian 122: 121 or equivalent. Intended for beginners or students placed by examination. Students who obtain a CEEB achievement score of 560 after Russian 121–122 attain qualification and may enter the 200-level sequence; otherwise Russian 123 is required for qualification.
Lec, T 2:30; drill, M W R F 8. Staff.
A thorough grounding is given in all the language skills: listening, speaking, reading, and writing. Language practice is in small groups. Lectures cover grammar, reading, and cultural information.

123 Continuing Russian Fall. 4 credits. Limited to students who have previously studied Russian and have a CEEB achievement score between 450 and 559. Satisfactory completion of Russian 123 fulfills the qualification portion of the language requirements.
M–F 3:35. Staff.
A pre-qualification course designed to prepare students for study at the 200 level. Passing this course is equivalent to qualification.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisite: qualification in Russian. Prerequisite for Russian 204: 203 or equivalent.
Lec, R 1:25; drill, M W F 11:15, 1:25, or 3:35.
A. Nakhimovsky and staff.
Guided conversation, composition, reading, pronunciation, and grammar review, emphasizing the development of accurate and idiomatic expression in the language.

Note: Students placed in the 200-level courses also have the option of taking courses in introductory literature; see separate listings under Russian 200, 201 and 202 for descriptions of these courses, any of which may be taken concurrently with the 203–204 language courses described above. The introductory literature courses are offered by the respective literature departments and the 203–204 language courses by the Department of Modern Languages and Linguistics.

[301–302 Advanced Russian Morphology and Syntax 301, fall; 302, spring. 4 credits each term. Prerequisite for Russian 301: 204 or equivalent. Prerequisite for Russian 302: 301. L. H. Babby. Not offered 1979–80; next offered 1980–81.]

303–304 Advanced Composition and Conversation 303, fall; 304, spring. 4 credits each term. Prerequisite for Russian 303: 204 or equivalent; Prerequisite for Russian 304: 303 or equivalent.
M W F 12:20. M. Rubinova.

305–306 Directed Individual Study 305, fall; 306, spring. 2 credits. Prerequisite for Russian 305: 303–304 or equivalent. Prerequisite for Russian 306: 305.
Hours to be arranged. M. Rubinova.
This is a practical language course on an advanced level and is designed to improve oral control of colloquial Russian.

403–404 Linguistic Structure of Russian 403, fall; 404, spring. 4 credits each term. Prerequisite for Russian 403: qualification in Russian; Linguistics 101–102 recommended. Prerequisite for Russian 404: 403 or equivalent. Offered alternate years.
T R 3:35 plus one hour to be arranged.
L. H. Babby.
A synchronic study and analysis of Russian linguistic structure. Russian 403 deals primarily with phonology and morphology and 404 with syntax.

601 Old Church Slavic Fall. 4 credits. This course is a prerequisite to Russian 602.
Hours to be aranged. W. Browne.

602 Old Russian Spring. 4 credits. Prerequisite: Russian 601.
Hours to be arranged. L. H. Babby.

700 Seminar in Slavic Linguistics Offered according to demand. Variable credit.
Staff.

Related Course

Comparative Slavic Linguistics (Linguistics 672)

Literature

103 Freshman Seminar: Classics of Russian Thought and Literature Fall and spring. 3 credits.
Sec. 1, T R 2:30–3:45, G. Gibian. Sec. 2, T R 12:20–1:35, staff.
Emphasis is on connections between Russian literary masterpieces and their historical background, rather than consider them solely as artistic works. It covers both nineteenth- and twentieth-century works. Readings in translation of Dostoevsky, Solzhenitsyn, and others.

104 Freshman Seminar: Nineteenth-Century Russian Literary Masterpieces Fall and spring. 3 credits.
Sec 1, M W F 12:20, staff. Sec 2, M W F 2:30, staff.
Readings in translation of works by Dostoevsky, Tolstoy, and others; limited to nineteenth-century authors. A slightly more literary and less historical course than Russian 103.

105 Freshman Seminar: Twentieth-Century Russian Literary Masterpieces Spring. 3 credits.
M W F 9:05. Staff.
Readings in English of works by Babel, Pasternak, Solzhenitsyn, and others, studied against the background of Soviet social and political developments.

106 Freshman Seminar: Revolution in the Russian Arts Fall. 3 credits.
M W F 9:05. P. Carden.
A study of the artistic revolution in Russia at the end of the nineteenth and beginning of the twentieth centuries. A look at Russian achievements in literature, music, the visual arts, stagecraft, film, and the dance in the context of the political and cultural climate of revolutionary fervor that characterized the Russia of the times. Examination of the theories and works of Andrei Biely, Mayakovsky, Isaac Babel, Stravinsky, Shostakovich, Diaghilev, Eisenstein, Meyerhold, and Malevich. The emphasis is on the Russians' integration of various art forms into a rich, multidimensional world of art.

201–202 Readings in Russian Literature 201, fall; 202, spring. 3 credits. Prerequisite: qualification in Russian. Open to freshmen. Completion of this series is the prerequisite for all 300- and 400-level literature courses in which the reading is done in Russian.
M W F 10:10. M. Senderovich.
Close reading of selected texts with attention to their stylistic features and their significance in Russian literary history.

[207 Themes from Russian Culture, 1800–1860 Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

[208 Themes from Russian Culture, 1860–Present Spring. 4 credits. Not offered 1979–80; next offered 1980–81.]

314 Intellectual Background of Russian Literature, 1750–1860 Fall. 4 credits.
T R 1:25 plus hour to be arranged. V. Ripp.
A survey of the key figures influencing the development of the literary tradition. A definition of the nature of the connection between literary and nonliterary writing, from Romanticism to the Revolutionary period, is attempted.

331 Russian Poetry Fall. 4 credits. Prerequisite: Russian 202 or equivalent, and permission of instructor. May be used toward satisfaction of the literature in the original requirement for Russian majors.
M W F 2:30. S. Senderovich.
A survey of Russian poetry with primary emphasis on analysis of individual poems by major poets.

[335 Gogol Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

[350 Tolstoy and the Disciplines (also College Scholar 350) Spring. 4 credits. Not offered 1979–80; next offered 1980–81.]

367 The Russian Novel in Translation Spring. 4 credits.
M W 2:20–3:45. G. Gibian.
Study of the major Russian prose writers of the nineteenth and twentieth centuries. Novels and short stories by Turgenev, Tolstoy, Dostoevsky, Chekhov, Solzhenitsyn, and others.

[368 Soviet Literature in Translation Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

[369 Dostoevsky Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

373 Chekhov Fall. 4 credits. Conducted in English. A special section is offered for students who read Russian; this section may be used toward satisfaction of the literature in the original requirement for Russian majors.
M W F 1:25–2:15. M. Senderovich.
Critical study of Chekhov's works in translation, with main emphasis on the short story; two plays are also included. The course is designed for nonspecialists as well as literature majors. Attention will be paid to Chekhov's semantics and underlying artistic structure. A variety of approaches will be employed. Informal lectures and discussions.

382 Nabokov Fall. 4 credits.
T R 11:15 plus hour to be arranged. V. Ripp.
An examination of the major works from the Berlin period through *Pale Fire*, with particular attention to Nabokov's emigré status. All readings in translation.

393 Honors Essay Tutorial Fall or spring. 4 credits.

415 Fairy Tale and Narrative (also Comparative Literature 415) Fall. 4 credits. Open to students who cannot read Russian. A section is scheduled for students who can read Russian.
T R 2:30–3:45. P. Carden.
Using Propp's classic work *Morphology of the Folktale* as a point of departure, we will look at examples of fairy tales and other traditional narratives, examples of nineteenth-century fictional narrative (short story, novel), and avant-garde narrative forms. We will discuss these narratives in the light of Propp's work and the critique of his work made by Meletinsky, Lévi-Strauss, Bremond, Greimas, and others.

431 Russian Prose Fiction Spring. 4 credits. Prerequisites: Russian 202 or the equivalent, and permission of instructor.
M W 11:15 plus hour to be arranged. V. Ripp.
An examination of selected shorter works with the aim of establishing the varying roles a narrator can assume, his rhetorical strategies, and the effect on the reader. Authors read include Nabokov, Chekhov, Babel, and Gogol.

432 Pushkin Spring. 4 credits. Prerequisites: Russian 202 or equivalent, and permission of instructor.
M W F 2:30. S. Senderovich.
Reading in the original language and discussion of selected works by Pushkin: lyrics, narrative poems, prose, plays, and *Eugene Onegin*.

492 Supervised Reading in Russian Literature Fall or spring. 2–4 credits. Initiated by the department.

611 Supervised Reading and Research Fall or spring. 2–4 credits. Prerequisite: permission of the department.

[617 Russian Stylistics Fall. 4 credits. Conducted in Russian. Not offered 1979–80; next offered 1980–81.]

[618 Russian Stylistics Spring. 4 credits. Conducted in Russian. Not offered 1979–80; next offered 1980–81.]

[621 Russian Literature from the Beginnings to 1700 Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

622 Eighteenth-Century Literature Fall. 4 credits. Conducted in Russian.
W 3:30. S. Senderovich.
A survey of the literary process in the first century of modern Russian literature. Reading in the original language and discussion of major works of the period.

624 Russian Romanticism Spring. 4 credits. Conducted in Russian.
W 3:30. S. Senderovich.
A survey of concepts, themes, genres, and main individual contributions in Russian literature of the Age of Romanticism.

[671 Seminar in Nineteenth-Century Russian Literature Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

672 Seminar in Twentieth-Century Russian Literature Spring. 4 credits.
R 3:35–5:30. G. Gibian.
Topic to be announced.

[701 Proseminar: Problems of Literary Criticism Fall. 4 credits. Not offered 1979–80; next offered 1980–81.]

Courses Offered in Translation

314 Intellectual Background of Russian Literature, 1750–1860 Fall. 4 credits.
T R 1:25 plus one hour to be arranged. V. Ripp.
A survey of the key figures influencing the development of the literary tradition, including an attempt to define the nature of the connection between literary and nonliterary writing, from Romanticism to the revolutionary period.

367 The Russian Novel in Translation Spring. 4 credits.
M W 2:20–3:45. G. Gibian.
Study of the major Russian prose writers of the nineteenth and twentieth centuries. Novels and short stories by Turgenev, Tolstoy, Dostoevsky, Chekhov, Solzhenitsyn, and others.

373 Chekhov Fall. 4 credits. Conducted in English. A special section is offered for students who read Russian; this section may be used toward satisfaction of the literature in the original requirement for Russian majors.
M W F 1:25–2:30. M. Senderovich.
Critical study of Chekhov's works in translation, with main emphasis on the short story; two plays are also included. The course is designed for nonspecialists as well as literature majors. Attention will be paid to Chekhov's semantics and underlying artistic structure. A variety of approaches will be employed. Informal lectures and discussions.

382 Nabokov Fall. 4 credits.
T R 11:15 plus hour to be arranged. V. Ripp.
An examination of the major works from the Berlin period through *Pale Fire*, with particular attention to Nabokov's emigré status. All readings in translation.

Sanskrit

See **Linguistics 641–642**

Serbo-Croatian

131–132 Elementary Course 131, fall; 132, spring. 3 credits each term. Prerequisite for Serbo-Croatian 132: 131 or equivalent.
Hours to be arranged. W. Browne.

[133–134 Elementary Course II 133, fall; 134, spring. 3 credits each term. Prerequisite for Serbo-Croatian 134: 133 or equivalent. E. W. Browne. Not offered 1979–80.]

Sinhala (Sinhalese)

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Sinhala 102: 101 or equivalent.
Hours to be arranged. J. W. Gair.
A semi-intensive course for beginners. A thorough grounding is given in all the language skills: listening, speaking, reading, and writing.

201–202 Sinhala Reading 201, fall, 202, spring. 3 credits each term. Prerequisite for Sinhala 201: qualification in Sinhala. Prerequisite for Sinhala 202: 201 or equivalent.
Hours to be arranged. J. W. Gair.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisite for Sinhala 203: 202 or permission of instructor. Prerequisite for Sinhala 204: 203 or equivalent.
Hours to be arranged. J. W. Gair.

Related Courses

See also **Linguistics 341, 442, 631, 640, 641, 644.**

Spanish

Languages and Linguistics

121–122 Elementary Course 121, fall; 122, spring. 4 credits each term. Prerequisite for Spanish 122: 121. Special sections of this course are available for students with qualification in another language. Intended for beginners or students placed by examination. Students who obtain a CEEB achievement score of 560 after Spanish 121–122 attain qualification and may enter the 200-level sequence; otherwise Spanish 123 is required for qualification.
Fall and spring: lec, R 12:20, R 2:30, F 9:05, or F 11:15; drill M–R 8, 9:05, 10:10, 11:15, 12:20, 1:25, 2:30, 3:35. Staff. Evening preliminary exams: fall, Oct. 9, Nov. 13; spring, Feb. 26, April 3. C. Piera.
A thorough grounding is given in all the language skills: listening, speaking, reading, and writing. Language practice is in small groups. Lecture covers grammar, reading, and cultural information.

123 Continuing Spanish Fall or spring. 4 credits. Limited to students who have previously studied Spanish and have a CEEB achievement score between 450 and 559. Satisfactory completion of Spanish 123 fulfills the qualification portion of the language requirement.
Fall: lec, M 11:15 or 1:25; drill, T–F 9:05, 10:10, 11:15, 12:20, or 1:25. Spring: lec, M 1:25; drill, 9:05, 10:10, or 12:20. Evening preliminary exams: fall, Oct. 9, Nov. 13; spring, Feb. 26, April 3.
L. D. King and staff.
An all-skills course designed to prepare students for study at the 200 level.

203 Intermediate Composition and Conversation Fall or spring. 3 credits. Prerequisite: qualification in Spanish.
Fall: M W F 8, 9:05, 10:10, 11:15, 12:20, 1:25, or 2:30; spring: M W F 8, 9:05, 10:10, 12:20, 1:25, or 2:30. Evening preliminary exams: fall, Oct. 9; spring, March 11. G. Whalen.
Conversational grammar review with special attention to the development of accurate and idiomatic oral expression. Includes readings in contemporary Spanish prose and practice in writing.

204 Intermediate Composition and Conversation Spring. 3 credits. Prerequisite: Spanish 203 or 212, or consent of the instructor.
M W F 9:05, 11:15, 12:20, or 1:25. G. Whalen.
Practice in conversation with emphasis on improving oral and written command of Spanish. Includes treatment of specific problems in grammar, expository writing, and readings in contemporary prose.

212 Intermediate Composition and Conversation Fall or spring. 3 credits. Prerequisite: qualification in Spanish.
M W F 9:05. E. Santí.
Designed to improve reading, writing, and speaking skills, this third-semester course offers an intensive review of grammar, while placing special emphasis on vocabulary expansion, composition, and the development of reading competence. Students will write several short essays in Spanish based upon readings from modern Hispanic prose and drama.

303 Advanced Composition and Conversation Fall. 4 credits. Prerequisite: Spanish 204 or equivalent.
M W F 10:10. M. Suñer.
Advanced course in grammar, composition, and conversation. Special attention to the fundamental aspects of language styles through the analysis of contemporary spoken and written Spanish.

[304 Advanced Composition and Conversation Spring. 4 credits. Prerequisite: Spanish 303 or equivalent. Not offered 1979–80; next offered 1980–81.]

[310 Advanced Conversation and Pronunciation Spring. 2 credits. Prerequisite: Spanish 204 or equivalent. Not offered 1979–80; next offered 1980–81.]

312 Advanced Composition Spring. 4 credits. Prerequisite: Spanish 201 or 204 or 212 or equivalent. Required of Spanish majors.
M W F 12:20. J. Tittler.
Emphasis is on developing analytical writing skills, vocabulary, and reading ability through the detailed analysis of selected contemporary texts. Special consideration is given to the problems of stylistics.

401–402 History of the Spanish Language 401, fall; 402, spring. 4 credits each term. Prerequisites: qualification in Spanish and Linguistics 101 or permission of instructor.
Hours to be arranged. C. Piera.

407 Applied Linguistics: Spanish Fall. 4 credits. Prerequisites: qualification in Spanish and Linguistics 101 or permision of instructor.
M W F 9:05. L. D. King.
Designed to equip the teacher of Spanish with the ability to apply current linguistic theory to the second-language learning situation.

[408 The Grammatical Structure of Spanish Spring. 4 credits. Prerequisites: qualification in Spanish and Linguistics 101 or permission of instructor. Not offered 1979–80; next offered 1980–81.]

601 Hispanic Dialectology Spring. 4 credits. Offered according to demand.
Hours to be arranged. M. Suñer.

602 Linguistic Structures of Ibero-Romance Fall or spring. 4 credits. Offered according to demand.
Hours to be arranged. M. Suñer.

603 Contemporary Theories of Spanish Phonology Fall. 4 credits. Offered according to demand.
Hours to be arranged. M. Suñer.

604 Contemporary Theories of Spanish Grammar Fall or spring. 4 credits. Offered according to demand.
Hours to be arranged. M. Suñer.

700 Seminar in Hispanic Linguistics Offered according to demand. Variable credit.
Hours to be arranged.

Related Course

Comparative Study of the Romance Languages (Romance Linguistics 321–322, 323–324, 620, 621, 622)

Literature

105 Freshman Seminar: Spanish Ironies Fall. 3 credits.
M W F 9:05. R. Quance.
A survey of the various concepts associated with the word "irony," followed by readings in English of Spanish ironists from the sixteenth century to the present. Discussions will focus on the writers' changing relationships with the social, economic, political, and religious structures of their world. Authors studied include Cervantes, Galdós, Sastre.

201 Introduction to Hispanic Literature Fall or spring. 3 credits. Prerequisite: qualification in Spanish or permission of instructor. Conducted mainly in Spanish. (The literature course that normally follows 201 is 315, 316, or 317.)
Fall: M W F 9:05, 12:20, 1:25 or T R 10:10–11:25; spring: M W F 12:20, 1:25, or T R 12:20–1:35.
J. Tittler and staff.
An intermediate reading course in which texts from Spain and Spanish America are read and analyzed. The course is designed to increase reading and speaking facility in Spanish and to develop critical and analytical skills in the appreciation of literary texts.

[313 Spanish Civilization Not offered 1979–80.]

315 Readings in Sixteenth- and Seventeenth-Century Hispanic Literature Fall. 4 credits. Prerequisite: Spanish 201 or 4 years of high school Spanish or permission of instructor. This course is not a prerequisite for Spanish 316 or 317.
M W F 10:10. M. Randel.
Readings and discussion of representative texts of the period from both Spain and her colonies in the New World.

316 Readings in Modern Spanish Literature Fall. 4 credits. Prerequisite: Spanish 201 or 4 years of high school Spanish or permission of instructor.
T R 10:10–11:25. J. Kronik.
Readings and discussion of representative texts from Spain from the Romantic period to the present: Zorrilla, Galdós, Unamuno, Garcia Lorca, Cela, and others.

317 Highlights of Spanish American Literature Since Independence Spring. 4 credits.
M W F 10:10. J. Tittler.
Reading and discussion of representative texts of the nineteenth and twentieth centuries from Spanish America: Dario, Neruda, Borges, Paz, Garcia Márquez, Cortázar, and others.

323 Latin American Civilization Fall. 4 credits. Conducted in Spanish.
M W F 11:15. E. Santi.
A study of the major periods of Latin American history and culture from the standpoint of politics, intellectual life, and art. Readings in both Spanish and English.

Note: The prerequisite for the following courses, unless otherwise indicated, is Spanish 315 or 316 or 317 or permission of instructor.

[332 Modern Drama in Spanish America Not offered 1979–80.]

[334 The Spanish American Short Story Not offered 1979–80.]

335 Cuba: Culture and Revolution Fall. 4 credits.
W 2:30–4:30. E. Santi, E. Kenworthy.
A study of the arts in Cuba as reflections of the conflicts and changes brought by the 1959 revolution. Emphasis is on prose narrative, but does not exclude theater and film. Topics include the role of the artist in social change; the government's changing cultural policy; intellectual freedom; Socialist Realism and its alternatives. Readings in history and politics supplement the literature (read in Spanish or in translation). If there is student interest, a trip to Cuba during Intersession may be planned.

336 Popular Culture in Contemporary Spanish-American Prose Fiction Spring. 4 credits.
M W 2:30–3:45. J. Tittler.
An inquiry into the nature of popular culture, its relationship to mass media, and its role in current fiction. Readings include works by Cabrera Infante *(Tres tristes tigres)*, Fuentes *(La cabeza de la hidra)*, Cortázar *(Libro de Manuel)*, Puig *(Boquitas pintadas, The Buenos Aires Affair)*, Vargas Llosa *(Pantaleón y las visitadoras, La tía Julia y el excribador)*, and Garcia Marquez *(Cien anos de soledad)*.

[351 Spanish Drama of the Golden Age Not offered 1979–80.]

[355 The Picaresque Novel in a European Perspective (also Comparative Literature 355) Not offered 1979–80.]

[356 Spanish-Lyric Poetry of the Golden Age Not offered 1979–80.]

[368 The Birth of the Novel in Spain: Toward Don Quijote Not offered 1979–80.]

[386 The Nineteenth-Century Spanish Novel Not offered 1979–80.]

[387 The Ideology of Independence and Romanticism in Spanish-American Literature Not offered 1979–80.]

389 Form and Formlessness in the Novel of the Generation of 1898 Fall. 4 credits.
T R 2:30–3:45. J. Kronik.
Analysis of representative prose fiction works by Unamuno, Baroja, Azorin, and Valle-Inclán, and discussion of the problems such as the struggle against traditional genre limitations, the search for new novelistic forms, art as game. Readings in the theory of fiction.

[391 The Post–Civil War Drama in Spain Not offered 1979–80.]

[395 The Post–Civil War Novel in Spain Not offered 1979–80.]

[398 Modern Hispanic Poetry Not offered 1979–80.]

419–420 Special Topics in Hispanic Literature 419, fall; 420, spring. 4 credits each term. Prerequisite: permission of instructor.
Staff.
Guided independent study of specific topics. For undergraduates interested in special problems not covered in courses.

429–430 Honors Work in Hispanic Literature 429, fall; 430, spring. 4 credits each term. Limited to seniors. Prerequisite: permission of instructor.
Staff.

[440 Medieval Literature from the Origins Through 1300 Not offered 1979–80.]

[441 Medieval Literature 1300–1508 Not offered 1979–80.]

446 The Early Spanish Love Lyric: Origins to 1700 Fall. 4 credits.
M 1:25–3:25. M. Randel.
A critical study, based upon close reading and discussion, of selected poems of the Middle Ages, Renaissance, and Baroque. Special emphasis on the *Razón de amor* and *la poesía de tipo tradicional*; on Garcilaso and Herrera, on Góngora and Quevedo.

[461 The Rhetoric of Honor Not offered 1979–80.]

466 Cervantes: *Don Quixote* Spring. 4 credits.
M 1:25–3:25. M. Randel.
Close reading of the text in its ideological and literary context. A survey of the history of interpretation of the work will serve as the basis for distinguishing meaning and significance of philosophical and aesthetic nature.

479 Colonial Spanish American Literature: Sor Juana, Ruiz de Alarcón, Inca Garcilaso Not offered 1979–80.]

[480 Romanticism in Spain Not offered 1979–80.]

[481 Eighteenth- and Nineteenth-Century Spanish Drama Not offered 1979–80.]

[496 Resonances of the Quijote in the Modern Hispanic Novel Not offered 1979–80.]

[629 Principles of Aesthetics and Literary Criticism Not offered 1979–80.]

639 Carlos Fuentes Fall. 4 credits.
T 4–6. J. Tittler.
A saturation study of the essays, stories, drama, and novels of one of contemporary Mexico's most prolific and influential minds. Readings include criticism on and by Fuentes, who is expected to address the seminar in person at some point during the semester.

699 Ortega Y Gasset's *The Dehumanization of Art and Ideas on the Novel* (1925) (also Comparative Literature 690) Spring. 4 credits. Conducted in Spanish.
R 2:25–4:25. C. M. Arroyo.
Analysis of the text and study of its incorporation into the European aesthetics of its time, which ranged from Marinette to Malraux's *Voices of Silence*.

Related Courses

Humanistic Interpretation of Spanish History (Society for the Humanities 413)

Colonial History of Spanish America (Society for the Humanities 414)

Tagalog

[101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Offered according to demand. Prerequisite: permission of instructor. Prerequisite for Tagalog 102: 101. Not offered 1979–80; next offered 1980–81.]

201–202 Tagalog Reading 201, fall; 202, spring. 3 credits each term. Prerequisite for Tagalog 201: 102 or equivalent. Prerequisite for Tagalog 202: 201 or equivalent.
Hours to be arranged. J. U. Wolff.

[300 Linguistic Structure of Tagalog Fall or spring. 4 credits. Prerequisite: Linguistics 101. Not offered 1979–80; next offered 1980–81.]

Tamil

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Offered according to demand. Prerequisite for Tamil 102: 101 or equivalent.
J. W. Gair.

Telugu

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Telugu 102: 101 or equivalent.
Hours to be arranged. G. Kelley.

201–202 Telugu Reading 201, fall; 202, spring. 3 credits each term. Prerequisite for Telugu 201: qualification in Telugu. Prerequisite for Telugu 202: 201 or equivalent.
Hours to be arranged. G. Kelley.

See also **Lingsistics 341, 440, 646.**

Thai

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Thai 102: 101 or equivalent. Intended for beginners or students placed by examination.
Lec, T R 11:15; drill, M–F 10:10. R. B. Jones.
A thorough grounding is given in all the language skills: listening, speaking, reading, and writing.

201–202 Thai Reading 201, fall; 202, spring. 3 credits each term. Prerequisite for Thai 201: qualification in Thai. Prerequisite for Thai 202: 201 or equivalent.
M W F 2:30. R. B. Jones.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisite for Thai 203: qualification in Thai. Prerequisite for Thai 204: 203.
Hours to be arranged. R. B. Jones.

301–302 Advanced Thai 301, fall; 302, spring. 4 credits each term. Prerequisite: Thai 201–202, or equivalent.
M W F 1:25. R. B. Jones.
Selected readings in Thai writings in various fields.

303–304 Thai Literature 303, fall; 304, spring. 4 credits each term. Prerequisite: Thai 301–302 or the equivalent.
Hours to be arranged. R. B. Jones.
Reading of significant novels, short stories, and poetry written since 1850.

401–402 Directed Individual Study 401, fall; 402, spring. 4 credits each term. For advanced students. Prerequisite: permission of instructor.
Hours to be arranged. R. B. Jones.

Ukrainian

[131–132 Elementary Course 131, fall; 132, spring. 3 credits each term. Prerequisite for Ukranian 132: 131 or equivalent. E. W. Browne. Not offered 1979–80; next offered 1980–81.]

Vietnamese

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Vietnamese 102: 101 or equivalent. Intended for beginners or students placed by examination.
Lec, T R 10:10; drill, M–F 11:15. R. B. Jones.
A thorough grounding is given in all the language skills: listening, speaking, reading, and writing.

201–202 Vietnamese Reading 201, fall; 202, spring. 3 credits each term. Prerequisite for Vietnamese 201: qualification in Vietnamese. Prerequisite for Vietnamese 202: 201.
Hours to be arranged. R. B. Jones.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisite for Vietnamese 203: qualification in Vietnamese. Prerequisite for Vietnamese 204: 203.
Hours to be arranged. R. B. Jones.

301–302 Advanced Vietnamese 301, fall; 302, spring. 4 credits each term. Prerequisite: Vietnamese 201–202 or equivalent.
Hours to be arranged. R. B. Jones.

303–304 Vietnamese Literature 303, fall; 304, spring. 4 credits each term. Prerequisite: Vietnamese 301–302 or equivalent.
Hours to be arranged. R. B. Jones.
Reading of selections from contemporary literature.

401–402 Directed Individual Study 401, fall; 402, spring. 4 credits each term. Prerequisite: permission of instructor. Intended for advanced students.
Hours to be arranged. R. B. Jones.

Music

Music Theory

141–142 Rudiments of Music Theory 141, fall; 142, spring. 3 credits each term. Some familiarity with music is desirable. Prerequisite for Music 142: 141 with grade of B– or better. Music 142 is limited to 50 students. May not be counted toward the requirements for the major in music.
M W 9:05; discussion to be arranged. D. M. Randel and staff.
An elementary, self-contained introduction to music theory, emphasizing fundamental musical techniques, theoretical concepts, and their application. Music 141: ear training; notation, pitch, meter; intervals, scales, triads; basic concepts of tonality; extensive listening to music in various styles; analysis of representative works of Bach, Mozart, Beethoven, and Debussy. 142: systematic introduction to counterpoint; original composition of four-part chorales or short keyboard pieces.

151–152 Elementary Theory 151, fall; 152, spring. 4 credits each term. Prerequisites for Music 151: a knowledge of the rudiments of music and some ability to perform. Prerequisite for Music 152: 151 or equivalent. Intended for students expecting to major in music and other qualified students. Required for admission to the music major. Students intending to major in music under Option II should enroll in Music 151–152 during their freshman year. Registration for this course is provisional depending upon the demonstration of adequate background and ability in proficiency tests given on the first two days of the term.
M W F 9:05, R 2:30–4. J. Webster and staff.
Detailed study of the fundamental elements of tonal music; rhythm, scales, intervals, triads; melodic movement, two-part counterpoint, harmonic progression in the chorale style of J. S. Bach; and introduction to analysis of small forms. Drill in aural discrimination, sight singing, keyboard harmony, and elementary figured bass; rhythmic, melodic, and harmonic dictation; and score reading.

251–252 Intermediate Theory 251, fall; 252, spring. 4 credits each term. Prerequisite for Music 251: 152 with a C or better. Prerequisite for Music 252: 251.
M W F 10:10, R 1:25–3. Fall, J. Hsu, D. R. M. Paterson; spring, E. Murray.
Continuation of study and writing in the chorale style of J. S. Bach, concentrating on seventh chords; also study of secondary dominants, modulation, augmented sixth chords, and the Neapolitan. Introduction to writing small forms using piano textures, combined with analysis of larger forms and sonatinas. Analysis and writing of two- and three-voice chorale preludes. Ear training, keyboard harmony, and score reading.

339 Ear Training and Sight Singing Fall. 1 credit. Limited to students who are participating in a University musical ensemble. Prerequisite: permission of instructor.
T 3:35. T. A. Sokol.
A practical course designed to improve the student's conception of melody and rhythm and to help sight-reading ability. Progressive class exercises in intervals, rhythms, melodies, and counterpoints.

351 Advanced Theory Fall. 4 credits each term. Prerequisite: Music 252 with a grade of C or better, or the equivalent.
M W F 9:05. E. Murray.
Inventions, chromatic harmony, analysis of larger forms and nineteenth-century music, ear training, score reading, and advanced keyboard studies including figured bass.

352 Advanced Theory Spring. 4 credits each term. Prerequisite: Music 351 with a grade of C or the equivalent.
T 10:10–12:05; 1 additional hour to be arranged. K. Husa.
Introduction to some techniques of composers from 1900 to 1950, including expanded tonal resources, atonality, and new approaches to form and rhythm. Analysis of representative smaller works by Bartók, Hindemith, Schoenberg, Stravinsky, Webern, and some American composers. Writing assignments in various styles.

[451 Modal Counterpoint and Analysis Spring. 4 credits. Prerequisite: Music 352 with a grade of C or better, or the equivalent. R. M. Palmer. Not offered 1979–80.]

[454 Fugue Spring. 4 credits. Prerequisite: Music 352 with a grade of C or better or the equivalent. M 10:10–12:05; R 12:20. R. M. Palmer. Not offered 1979–80.]

[456 Orchestration Fall. 4 credits. Prerequisite: Music 352 or equivalent. T 10:10–12:20. K. Husa. Not offered 1979–80.]

[457 Analysis and Composition (Proseminar) Fall. 4 credits. Prerequisite: Music 352 or permission of instructor. T R 10:10; 1 additional hour to be arranged. R. M. Palmer. Not offered 1979–80.]

460 Electronic Music Composition Spring. 3 credits. Limited to 10 students. Prerequisites: Music 252 and permission of instructor.
M 1:25–4:25. M. W. Stith and staff.
The basic techniques of writing music by electronic means, including musique concrète, tape recorder techniques such as rerecording and splicing, and the use of synthesizers. Works by electronic music composers and readings from current literature are studied. Students are allotted studio time to carry out class projects and assignments.

462 Orchestral Conducting Spring. 2 credits. Prerequisite: Music 352.
➥ T 10:10–12:05. K. Husa.
The fundamentals of score reading and conducting technique, study of orchestral scores from baroque, classical, romantic and contemporary periods. Occasionally class will visit the Cornell orchestra, wind ensemble, and choruses.

[463 Choral Conducting Spring. 2 credits. Prerequisite: Music 252 or permission of instructor. F 2:30–4:10. T. A. Sokol. Not offered 1979–80.]

[464 Choral Style Spring. 2 credits. Prerequisite: Music 352 or permission of instructor. F 2:30–4:10. T. A. Sokol. Not offered 1979–80.]

Music History

101 Introduction to Music Fall. 3 credits.
T R 10:10; discussion to be arranged.
C. A. Barbera.
An introduction to the elements of music and its principal forms in the West. Topics include pitch, rhythm, timbre, the principal forms of instrumental and vocal music, including symphony and opera, and musical aesthetics.

111–112 Freshman Seminar in Music 111, fall; 112, spring. Section 1 limited to 40 students; section 2 limited to 20 students. No prerequisites; students do not need to have studied music.
Sec. 1: M W F 10:10; B. Kernfeld, S. Ward. Sec. 2: M W F 11:15; D. M. Randel.
Ways of listening to music, thinking about music, talking about music, and writing about music. Non-Western music and popular music are considered, as well as Western "classical" music. Student performances in class are welcome.

[213 The Art of Music Fall. 3 credits. T R 11:15; discussion to be arranged. W. W. Austin and assistants. Not offered 1979–80.]

214 Opera Fall. 3 credits. Graduate students who wish to take this course should register for Music 697.
T R 11:15. C. Greenspan.
A study of the forms and conventions of opera. The shifting balance between musical and dramatic factors; the changing emphasis on the contributions of the librettist, the composer and the performer; Monteverdi, Handel, Mozart, Verdi, Wagner, Debussy, and Berg.

218 Chopin, Chaikovski, Musorgskii Spring. 3 credits. Students may wish to register concurrently in Music 219.
T R 11:15; discussion to be arranged. W. W. Austin, G. Gibian, and staff.
Chief works of the three composers, including symphonies, concertos, and operas, are studied through phonograph records. Piano music and chamber music are presented in live performance. The biographical, social, and intellectual contexts of the music are considered in relation to concerns of the present. Students' essays may deal with such concerns more than any technical aspect of the music, though techniques are not neglected.

219 Chopin, Chaikovski, Musorgskii Spring. 1 credit. Prerequisite: reading knowledge of Russian. Limited to students concurrently enrolled in Music 218.
Seminar to be arranged.
See course description for Music 218.

220 History of Jazz Spring. 3 credits.
M W F 11:15. C. A. Barbera.

303 The Organ and Its Literature Fall. 4 credits. Prerequisites: Music 152, plus general knowledge of music history and permission of the instructor.
M W F 11:15. D. R. M. Paterson, and guest lecturers and performers.
Historical, technical, and analytical survey of the history of the organ, its construction and design, and its most significant repertory.

[304 Musical Improvisation Spring. 4 credits. Prerequisite: Music 152. M W F 2:30; additional hour to be arranged. J. Spitzer. Not offered 1979–80.]

[315 Brahms, Wagner, and the End of an Era Fall. 4 credits. Prerequisite: any course in music or permission of instructor. D. M. Randel. Not offered 1979–80.]

[317 Music and Poetry in France: Late Middle Ages and Renaissance (also French 617) Fall. 4 credits. D. M. Randel, E. P. Morris. Not offered 1979–80.]

[318 Baroque Instrumental Music Spring. 3 credits. Prerequisite: a course in music history or music theory, or permission of instructor. T R 9:05. Not offered 1979–80.]

[319 Music Criticism Fall. 4 credits. Prerequisite: Music 152 or permission of instructor. M W F 1:25. C. Greenspan. Not offered 1979–80.]

381 Monteverdi to Mozart Fall. 4 credits. Prerequisite: Music 152 or permission of instructor.
M W F 1:25. N. Zaslaw.
The history of music from the emergence of baroque style around 1600 through the classical period at the end of the eighteenth century. Emphasis on works of Monteverdi, Schütz, Purcell, J. S. Bach, Händel, Haydn, and Mozart.

382 Beethoven to Debussy Spring. 4 credits. Prerequisite: Music 152 or permission of instructor.
M W F 2:30. C. Greenspan.
The history of musical styles from Beethoven's time through the beginning of the twentieth century. Emphasis on works of Beethoven, Schubert, Schumann, Chopin, Verdi, Wagner, Brahms, Mahler, and Debussy.

[385 Schoenberg, Bartók, and Stravinsky Fall. 3 credits. M W 11:15. W. W. Austin. Not offered 1979–80.]

[387 Mozart, His Life, Works, and Times (also German 387) Fall. 4 credits. N. Zaslaw, S. L. Gilman. Not offered 1979–80.]

[426 Poetry and Music in the English Renaissance (also English 426) Spring. 4 credits. W F 12:20–1:35. E. Murray, B. Rosecrance. Not offered 1979–80.]

[481 Music in Western Europe to Josquin Des Pres Fall. 4 credits. Prerequisite: Music 381–382 or permission of instructor. M W F 12:20. D. M. Randel. Not offered 1979–80.]

482 Josquin Des Pres to Monteverdi Spring. 4 credits. Prerequisite: Music 381–382 or permission of instructor.
M W F 11:15. C. A. Barbera.
A survey of the principal styles, genres, and composers of late Renaissance music.

Independent Study

301–302 Independent Study in Music 301, fall; 302, spring. Prerequisite: departmental approval.
Hours and credits to be arranged. Staff.

The Honors Program

401–402 Honors in Music 401, fall; 402, spring. 4 credits each term. Limited to honors candidates in their senior year.
Staff.

Musical Performance

321–322 Individual Instruction in Voice, Organ, Harpsichord, Piano, and String, Woodwind, and Brass Instruments Prerequisite: successful audition with instructor during registration period. Music 321 is not a prerequisite to 322.

Without credit: basic fee for one half-hour lesson weekly during one term, $90; fees for a practice schedule of six hours weekly during one term: $45 for the use of a pipe organ, $22 for a practice room with piano, $7 for a practice room without piano.

For credit: one one-hour lesson weekly (or two half-hour lessons) and a double practice schedule earn 2 credits each term, provided the student has earned, or is earning, at least 3 credits in courses in music history or music theory for every 4 credits in Music 321–322. The basic fees are multiplied by one and one-half (lesson fee becomes $135; practice fees $67, $33, or $10).

All fees are *nonrefundable* once classes begin, even if registration is subsequently cancelled by the student. A student may register for this course in successive years. Members of Cornell musical organizations and ensembles receive scholarships of one-half of their lesson fees. The Department of Music offers a limited number of additional partial scholarships for lesson fees for cases of both need and special merit.

Instruments not taught at Cornell may, under certain conditions, be studied for credit with outside teachers who have been approved by the department. For information inquire at the department office.

321a–322a Individual Instruction in Voice 321a, fall; 322a, spring. 2 credits each term.
Hours to be arranged. B. Troxell.

321b–322b Individual Instruction in Organ 321b, fall; 322b, spring. 2 credits each term.
Hours to be arranged. D. R. M. Paterson.

321c–322c Individual Instruction in Piano 321c, fall; 322c, spring. 2 credits each term.
Hours to be arranged. M. Bilson and staff.
Students required to take 321c–322c in order to pass the Department of Music's piano examination may enroll without paying lesson fee.

321d–322d Individual Instruction in Harpsichord 321d, fall; 322d, spring. 2 credits each term.
Hours to be arranged. D. R. M. Paterson.

321e–322e Individual Instruction in Violin or Viola 321e, fall; 322e, spring. 2 credits each term.
Hours to be arranged. S. Monosoff.

321f–322f Individual Instruction in Cello or Viola da Gamba 321f, fall; 322f, spring. 2 credits each term.
Hours to be arranged. J. Hsu.

321g–322g Individual Instruction in Brass Instruments 321g, fall [not offered 1979–80]; 322g, spring. 2 credits each term.
Hours to be arranged. M. W. Stith.

391–392 Advanced Individual Instruction 391, fall; 392, spring. 4 credits each term. Open only to juniors and seniors who are majoring under Option II with concentration in performance, and to graduate students. Music 391 is not a prerequisite to 392.
Hours to be arranged. Staff.

Musical Organizations and Ensembles

Students may participate in musical organizations and ensembles throughout the year. Permission of the instructor is required, and admission is by audition only, except in the Sage Chapel Choir. Registration is permitted in two of these courses simultaneously and students may register in successive years, but no student may earn more than 6 credits in these courses. Membership in these musical organizations and ensembles is also open to qualified students who wish to participate without earning credit.

331–332 Sage Chapel Choir Fall or spring. 1 credit. No audition for admission.
M 7–8:30 p.m., R 7–8:30 p.m., Sunday 9:30 a.m.
D. R. M. Paterson.

333–334 Cornell Chorus Fall or spring. 1 credit. Prerequisite: permission of instructor.
T 7:15–9:15 p.m., Sunday 2:15–3:45 p.m. or 7:15–9:15 p.m. T. A. Sokol.

335–336 Cornell Orchestra Fall or spring. 1 credit. Chamber orchestra limited to more experienced players.
Rehearsals for the Cornell Symphony Orchestra: full orchestra, W 7:30–10 p.m.; sectional rehearsals, alternate T or R 7:30–10 p.m.
Rehearsals for the Cornell Chamber Orchestra, R 7:30–10 p.m. E. Murray.

337–338 University Bands 1 credit.
Symphonic band: fall, M 7:30–9:30 p.m. and W 4:30–5:45 p.m.; spring, T 4:30–5:45 p.m. and W 4:30–5:45 p.m. Wind ensemble: spring only, M 7:30–9:30 p.m. and R 4:30–5:45 p.m. M. W. Stith.
Students interested in participating in the Big Red Marching Band may inquire at the Department of Athletics, Teagle Hall.

441–442 Chamber Music Ensemble 1 credit.
Prerequisite: permission of instructor.
S. Monosoff and staff.
Study and performance of chamber music literature; string and wind groups, piano trios and quartets, trio sonatas, etc. Emphasis on musical problems, with some practice in sight reading.

443–444 Chamber Singers 1 credit. Prerequisite: permission of instructor.
F 4:30–6. T. A. Sokol.
Study and performance of selected vocal music for small choir.

445–446 Gamelan Ensemble 1 credit.
Prerequisite: permission of instructor.
Hours to be arranged. Staff.
Basic theory and performance techniques of Central Javanese gamelan.

447–448 Collegium Musicum 1 credit.
Prerequisite: permission of instructor.
Hours to be arranged. J. Hsu.
Study and performance of medieval, Renaissance, and baroque vocal and instrumental music, with recorders, crumhorns, sackbutts, viols, shawms, organ, harpsichord, and other early instruments.

Graduate Courses

Open to qualified undergraduates with permission of the instructor.

[617 Music and Poetry in France: Late Middle Ages and Renaissance (also Music 317 and French 617) Fall. 4 credits. W 2:30–4:30, additional hour to be arranged. D. M. Randel, E. P. Morris. Not offered 1979–80.]

651 Twentieth-Century Classics Spring. 4 credits.
Prerequisite: Music 352 or permission of instructor.
T 10:10–12:05. R. M. Palmer.
A general analysis of Bartók's string quartets 1, 3, and 5, with a detailed examination of tonality and rhythm. (Quartets 2, 4, and 6 will be studied in spring 1981.) Live performance of the works is an integral part of the course.

652 Rhythms Spring. 4 credits. Open to students in languages, psychology, philosophy, dance, anthropology, etc., who receive permission of instructor.
M 2:30–4:25. W. W. Austin.
Comparative studies of rhythmic schemes and performances in various styles.

[653 Analysis of Structure and Function in Tonal Music Spring. 4 credits. R. M. Palmer. Not offered 1979–80.]

657–658 Composition 657, fall [not offered 1979–80]; 658, spring. 4 credits.
W 2:30–4:25. R. Palmer.

659–660 Composition 659, fall; 660, spring. 4 credits.
T 2:30–4:25. K. Husa.

681 Introduction to Research and Bibliography Fall. 4 credits. Prerequisites: reading knowledge of French and German, and familiarity with music theory and general music history.
M 1:25–4:25. M. A. Keller.

[682 Wagner (also German 682) Spring. 4 credits. W 1:25–3:25. J. Webster, E. A. Blackall. Not offered 1979–80.]

[685 Schoenberg, Bartók, and Stravinsky Fall. 5 credits. Prerequisites: ability to play Stravinsky's *Pieces for the Five Fingers*, and reading knowledge of one relevant foreign language — French, German, Russian, or Hungarian. M W F 11:15. W. W. Austin. Not offered 1979–80.]

[686 Beethoven Spring. 4 credits. R 1:25–4:25. J. Webster. Not offered 1979–80.]

[687 Mozart: His Life, Works, and Times (also German 757) Fall. 4 credits. N. Zaslaw, S. L. Gilman. Not offered 1979–80.]

689 Haydn Fall. 4 credits. Prerequisites: Music 653 or equivalent and reading knowledge of German.
T 1:30–4:30. J. Webster.

690 Ballad Opera Spring. 4 credits.
R 2:30–4:15. N. Zaslaw.

[692 Performance Practice Spring. 4 credits. R 2:30–4:15. N. Zaslaw. Not offered 1979–80.]

697–698 Independent Study and Research
Hours and credits to be arranged. Staff.

783–784 Seminar in Medieval Music 783, fall; 784, spring. 4 credits each term.
W 2–4:30. C. A. Barbera.

[785–786 History of Music Theory Fall. 4 credits each term. Prerequisite: reading knowledge of French or German. J. Webster. Not offered 1979–80.]

[787–788 Debussy to Boulez 787, fall; 788, spring. 4 credits each term. W. W. Austin. Not offered 1979–80.]

[789–790 Liturgical Chant in the West 789, fall; 790, spring. 4 credits each term. D. M. Randel. Not offered 1979–80.]

Related Courses in Other Departments

Exchanges of Structural Ideas in Literature and Music (Society for the Humanities 415)

Theory and Practice of Research into Musical Reception, Based on the Examples of Beethoven, Wagner, and Mahler (Society for the Humanities 416)

Near Eastern Studies

Hebrew

101–102 Elementary Modern Hebrew I and II 101, fall; 102, spring. 6 credits each term. Each section limited to 15 students. Prerequisite for NES 102: 101 or permission of instructor. Satisfactory completion of NES 102 fulfills the qualification portion of the language requirement.
Sec 1, M–F 9:05; sec 2, M–F 10:10; sec 3, M–F 11:15; sec 4, M–F 1:25.
The fundamentals of modern Israeli Hebrew, emphasizing reading, writing, listening, and speaking skills. Small groups led by native Hebrew speakers are supplemented with work at the language laboratory.

[103–104 Elementary Classical Hebrew 103, fall; 104, spring. 4 credits each term. Not offered 1979–80; next offered 1980–81.]

201–202 Intermediate Modern Hebrew I and II 201, fall; 202, spring. 3 credits each term. Each section limited to 15 students. Prerequisite for NES 201: 102 or permission of instructor. Prerequisite for NES 202: 201 or permission of instructor. Satisfactory completion of NES 202 fulfills the proficiency portion of the language requirement.
Sec 1, M W F 9:05; sec 2, M W F 11:15.
R. Hoberman.
Second-year modern Israeli Hebrew. Continued development of reading, writing, listening, and speaking skills. Review of grammar; readings from contemporary Israeli prose and poetry; guided conversation and composition. Small groups by native Hebrew speakers are supplemented with work at the language laboratory.

231–232 Readings in Classical Hebrew Literature 231, fall; 232, spring. 3 credits each term. Prerequisite: NES 104, or equivalent with permission of instructor. May be used to satisfy the distribution requirement in the humanities. Satisfactory completion of NES 231–232 satisfies the proficiency portion of the language requirement.
M W F 10:10. M. Collins.
Intensive reading of selected prose and poetic texts. Emphasis on fluency in reading and translating with special attention to Hebrew style and expression.

[301 Advanced Modern Hebrew I 4 credits. Not offered 1979–80.]

302 Advanced Modern Hebrew II Spring. 4 credits. Limited to 15 students. Prerequisite: NES 202 or permission of instructor. Conducted in English and Hebrew.
M W F 1:25. R. Hoberman.
Historical survey of Hebrew grammar, with the focus on the diachronic development of Hebrew syntax. Analytical study of selected texts from biblical, postbiblical, and modern Hebrew poetry and prose. Selected topics in Afro-Asiatic and comparative Semitic linguistics are introduced.

303 Independent Study Fall or spring. 2–4 credits. Prerequisite: permission of instructor.

Arabic

111–112 Elementary Arabic 111, fall; 112, spring. 6 credits per term. Limited to 15 students. Prerequisite for NES 112: 111 or permission of instructor.
M–F 12:20. D. S. Powers.
An introduction to the phonology, morphology, and syntax of classical and modern standard Arabic. A thorough background in grammar is stressed. Reading selections from the Qur'ān, the classical period, and modern period are studied. Introduction to Arabic dialectology.

211–212 Intermediate Arabic 211, fall; 212, spring. 3 credits per term. Prerequisite for NES 211: one year of Arabic or permission of instructor. Prerequisite for NES 212: 211 or permission of instructor.
T R 2:30–3:45. R. Hoberman.
The grammar of classical and modern standard Arabic is stressed. Extensive readings are selected from the Qur'ān, the classical period, and the modern period. Some introductory topics in Arabic dialectology and comparative Semitic linguistics are discussed.

[311–312 Advanced Arabic: Readings in the Qur'ān and Qur'ān Commentary 311, fall; 312, spring. 4 credits each term. Not offered 1979–80.]

351 Independent Study Fall or spring. 2–4 credits. Prerequisite: permission of instructor.
Staff.

Akkadian

323–324 Elementary Akkadian 323, fall; 324, spring. 4 credits each term. Prerequisite: permission of instructor.
T R 2:30–3:45. D. I. Owen.
An introduction to the grammar of Akkadian and the cuneiform writing system. Reading of selected passages in the standard Assyrian script from the Code of Hammurabi and the Annals of Sennacherib, as well as an introduction to Babylonian civilization.

[325 Readings in Akkadian Texts Fall or spring. 3 credits. Not offered 1979–80.]

Aramaic

327 Aramaic Spring. 4 credits. Prerequisite: permission of instructor.
M W F 9:05. M. Collins.
The western Aramaic of the Bible, the Qumran Scrolls, and the Targums; reading of selected texts.

Ethiopic

See below under "Comparative Semitic Linguistics."

Ugaritic

[328 Ugaritic Fall. 3 credits. Not offered 1979–80.]

Comparative Semitic Linguistics

[329 Introduction to Comparative Semitic Linguistics through Ethiopic Spring. 4 credits. Not offered 1979–80.]

Ancient Near Eastern Literature

[282 Ancient Near Eastern Literature (also Comparative Literature 226) Spring. 4 credits. Not offered 1979–80.]

Biblical Literature

[221 Literature of Ancient Israel I Fall. 3 credits. Not offered 1979–80.]

222 Literature of Ancient Israel II: Bible, Dead Sea Scrolls, Apocalyptic Literature Spring. 3 credits. Open to freshmen.
M W F 11:15. M. Collins.
A survey of the literature of Ancient Israel from the sixth century B.C.E. to the first century C.E. Emphasis is on the texts as literature within the social, religious, and political milieu.

225 Freshman Seminar in Biblical Literature: Heroes and Heroines of the Bible Fall. 3 credits. May be used toward fulfilling the distribution requirement in the humanities. May also be used toward completion of a concentration in Jewish studies.
M W F 9:05. M. Collins.
A study of the characterization of famous figures in ancient Israel known for their accomplishments as soldiers, sages, kings, queens, courtiers, and prophets. The focus is on the significance and portrayal of personalities (such as Moses, David, Elijah, Esther) both in the original stories, and in Jewish and Christian lore and legends in antiquity.

231–232 Readings in Classical Hebrew Literature See course description above, under "Hebrew."

326 Independent Study Fall or spring. 2–4 credits. Prerequisite: permission of instructor.
M. Collins.

Rabbinic Literature

[333 The Historical Development of Rabbinic Legal Literature Spring. 4 credits. Not offered 1979–80.]

334 Biblical Interpretation in Rabbinic Literature Fall. 4 credits. Students may wish to enroll concurrently in NES 335.
Lec, M W F 11:15. M. Collins.
A general introduction to modes of interpreting the Hebrew Bible from the sixth century B.C.E. through the early medieval period. Readings in translation from the Dead Sea Scrolls, New Testament, Rabbinic Literature, Rashi, and others. The background of each period and text, the process of the development of biblical interpretation, and its importance to different communities is discussed.

335 Readings in Postbiblical Hebrew Literature Fall. 1 credit. Prerequisites: concurrent enrollment in NES 334 and knowledge of Hebrew.
Hours to be arranged. M. Collins.
Reading of selected texts in the original.

339 Independent Study Fall or spring. 2–4 credits. Prerequisite: permission of instructor.
Staff.

Medieval Hebrew Literature

[371 The Secular Hebrew Poetry of the Andalusian Period: Muslim Spain Spring. 4 credits. Not offered 1979–80.]

Modern Hebrew Literature

260–261 Modern Hebrew Literature in English Translation 260, fall; 261, spring. 4 credits each term.
M W F 2:30. Staff.
A survey in translation of the major Hebrew writers from the postbiblical to the modern period.

361 Seminar in Modern Hebrew Literature: The National Renaissance Fall. 4 credits.
M W F 1:25. Staff.

[362 Seminar in Modern Hebrew Literature: The National Renaissance Spring. 4 credits. Not offered 1979–80.]

[363 Seminar in Modern Hebrew Literature: The Enlightenment Fall. 4 credits. Not offered 1979–80.]

364 Seminar in Modern Hebrew Literature: The Enlightenment Spring. 4 credits.
M W F 1:25. Staff.

366 Seminar in Modern Hebrew Literature: The Israeli Short Story Fall. 4 credits. Prerequisite: NES 202 or equivalent advanced Hebrew language course, or permission of instructor. Conducted in Hebrew.
M W F 12:20. Staff.
An analytical study of the narrative art of Israel's contemporary writers.

[367 Seminar in Modern Hebrew Literature: The Israeli Novel Spring. 4 credits. Not offered 1979–80.]

[368 Agnon and Hazaz Spring. 4 credits. Not offered 1979–80.]

369 Independent Study Fall or spring. 2–4 credits each term. Prerequisite: permission of instructor. Open to majors and other qualified students.
Staff.

Yiddish Literature

375 The Shtetl in Modern Yiddish Fiction in English Translation (also German Literature 375) Fall. 4 credits.
T R 2:30–3:45. S. Slotnick.
The shtetl, or small Jewish town, has always been a central subject of Yiddish fiction. This course will deal with the literary image of the shtetl in prose works from the nineteenth and twentieth centuries. From the earliest literary treatments of the shtetl to the most modern works, its social and economic realities were exaggerated, distorted, and otherwise manipulated by Yiddish writers for a variety of artistic purposes. Beginning with a solid knowledge of the actual shtetl (its social, economic, and political aspects), we will proceed to discuss a series of works which satirize, criticize, idealize, and perform other literary transformations on the reality of the small Jewish town.

377 Topics in Yiddish Literature (also German Literature 377) Spring. 4 credits.
Hours to be arranged. S. Slotnick.
Topic to be announced.

History of the Jewish People

243 History of Ancient Israel to 450 B.C.E. Spring. 4 credits.
T R 10:10–11:25. D. I. Owen.
A detailed survey of the history of ancient Israel from the traditional origins in the early second millennium (ca. 2000 B.C.E.) through the Babylonian Exile to the arrival of Ezra and Nehemiah (ca. 450 B.C.E.). Discussion of biblical and Near Eastern sources relating to the history of Israel, as well as the archaeological evidence.

244 Jews of the Ancient and Muslim Near East: 450 B.C.E.–1204 C.E. Fall. 4 credits.
T R 9:05; discussion to be arranged. J. Cohen.
A survey of the political, cultural, and social history of the Jews, from the period of Ezra and Nehemiah until the death of Moses Maimonides. The focus is on the link between the Jewish history of late ancient and early medieval times and the evolution of the classical Jewish world view, as the development of the Jewish community is traced from that of a local tribal kingdom to that of a multinational religion. Of special concern is the interaction of the Jews with innovative cultural trends in the Gentile world around them — first that of Greece and Rome, then those of Christianity and Islam to which the Jewish community helped give rise. Emphasis is on the reading of historical documents in translation.

245 Jews of the Christian West: 476–1948 Spring. 4 credits.
T R 9:05; discussion to be arranged. J. Cohen.
A survey of the political, cultural, and social history of the Jews in the West, from the fall of Rome until the Holocaust and the establishment of the State of Israel. The treatment of Jews in medieval Christendom and their gradual emancipation into modern society, along with corresponding developments in Jewish culture are emphasized as the complex background of the modern Jewish experience is explored. Emphasis is on the reading of historical documents in translation.

343 The Jewish Community Throughout History Spring. 4 credits. Prerequisite: permission of instructor.
Hours to be arranged. J. Cohen.
A seminar on the evolving dynamics of Jewish communal organization from ancient to modern times. Discussions of both primary and secondary sources will consider the various legal, political, socioeconomic, and religious institutions and beliefs which held the Jewish community together in different environments. Particular emphasis will be placed on the factors which caused major changes in the Jewish community, especially during the last 200 years.

[344 Age of the Patriarchs Fall. 4 credits. Not offered 1979–80.]

347 Judaism and Christianity in Conflict Fall. 4 credits. Prerequisite: permission of instructor.
Hours to be arranged. J. Cohen.
A study of the roots and development of the

inevitable theological conflict between Jews and Christians that arose soon after the death of Jesus, and the effects of that conflict on the synogogue and church in ancient and medieval times. Through the intensive reading of primary sources, the importance of Christian-Jewish relations in the history of the Jews, the development of Christianity, and the growth of modern anti-Semitism are explored.

348 Independent Study Fall or spring. 2–4 credits. Open to qualified students. May be repeated for credit.
J. Cohen, D. I. Owen.
Directed readings on the history, culture, and civilization of ancient Israel and the Jewish people.

History of Ancient Near Eastern Civilizations

[345 History of the Ancient Near East Fall. 4 credits. Not offered 1979–80.]

349 Independent Study Fall or spring. 2–4 credits. May be repeated for credit. Prerequisite: permission of instructor.
D. I. Owen.
Directed readings on the history, culture, and civilization of the ancient Near East.

[385 Interconnections in the Eastern Mediterranean World in Antiquity Spring. 4 credits. Not offered 1979–80.]

Related Course in Another Department

[Greeks and Their Eastern Neighbors (Classics 322) Not offered 1979–80.]

Near Eastern and Biblical Archaeology

248 Introduction to Art History: Art of Egypt and Mesopotamia (also History of Art 211) Spring. 3 credits.
M W F 1:25. J. M. Weinstein.
A survey of the art and architecture of Mesopotamia and Egypt from the Stone Age to the Greco-Roman period. Common ideas and motifs are explored as well as historical relationships.

249 Ancient Seafaring (also Archaeology 275) Fall. 3 credits.
T R 10:10–11:25. D. I. Owen.
A survey of the history and development of archaeology under the sea. The role of nautical technology and seafaring among the maritime peoples of the ancient Mediterranean world—Canaanites, Minoans, Mycenaeans, Phoenicians, Hebrews, Greeks, and Romans—as well as the riverine cultures of Mesopotamia and Egypt. Evidence for maritime trade, economics, exploration and colonization, and the role of the sea in religion and mythology are discussed.

280 Mediterranean Archaeology (also Classics 200 and Ancient Mediterranean Studies 200) Fall. 3 credits. No prerequisites.
T R 12:20–1:35. J. E. Coleman, J. M. Weinstein, with guest lecturers.
The archaeological bases of ancient Mediterranean civilization, focusing on contacts and interrelationships in the Bronze Age. Topics include: the rise of civilization in Egypt; the Bronze Age states of Syro-Palestine (Ebla, Ugarit, Byblos, etc.); the Hittites and Bronze Age Anatolia; Minoans, Mycenaeans, and their eastern and western contacts; the role of Cyprus; the invention and spread of writing; ancient shipping and trade.

[285 Introduction to Biblical Archaeology Spring. 3 credits. Not offered 1979–80.]

386 Introduction to Field Archaeology in Israel Summer.
D. I. Owen.
See course description *Cornell Summer 1979*.

387 Archaeology of the Ancient Near East (also Archaeology 310) Spring. 4 credits. Prerequisite: Archaeology 100 or permission of instructor.
M W F 11:15. J. M. Weinstein.
Ancient civilizations between the Indus and the Mediterranean, from the first stone tool to the palace at Persepolis; Sumerian, Assyrian, Babylonian, Israelite, Phoenician, and Persian remains in terms of indigenous developments and cross-cultural contacts.

388 Archaeology of Ancient Egypt Fall. 4 credits.
T R 2:30–3:45. J. M. Weinstein.
A detailed survey of the archaeology of ancient Egypt from prehistoric times to the end of the pharaonic period. Major developments in art and architecture are also covered. An introduction to the history of Egyptology, the development of methodology in Egyptian archaeology, and some of the basic excavation reports. Other topics considered include the dating of minor antiquities, pyramid construction, and mummification.

[481 Seminar in Syro-Palestinian Archaeology: The Israelite Conquest of Canaan Fall. 4 credits. Not offered 1979–80.]

Related Course in Another Department

[The Archaeology of Cyprus (Classics 321) Not offered 1979–80.]

Islamics

250 Classics of Islamic Literature Spring. 3 credits. A Freshman Seminar.
M W F 9:05. D. S. Powers.
A study of the culture and poetry of pre-Islamic Arabia, Muhammad and the *Koran*, and works of traditional and secular authors of the eighth to thirteenth centuries. The diversified culture of the Islamic "Golden Age," which has set the standard for subsequent intellectual and cultural developments in the Muslim World, is introduced through readings in translation.

253 Introduction to Islamic Civilization (600–1258) Fall. 3 credits.
M W F 9:05. D. S. Powers.
A broad survey of major aspects of Islamic history, culture, and civilization from the birth of Muhammad to the conquest of Baghdad by the Mongols. Students read translations of primary sources and view a series of films on the traditional Islamic world.

[374 The Mystics of Islam Spring. 4 credits. Not offered 1979–80.]

376 Seminar on Islamic Law and Society Spring. 4 credits.
T R 2:30–3:45. D. S. Powers.
After examining the historical origins of Islamic law, the class focuses on selected areas of the law, with the aim of elucidating broad social issues: the status of women in Islam; the nature of slavery; the position of non-Muslims; the institutions of the Islamic city; the relation between the religious establishment and government; the relevance of Islamic law in the modern world.

Honors Course

400 Independent Study: Honors Fall or spring. 2–4 credits.
Directed readings and conferences center on the candidate's honors thesis. The thesis topic must be approved by the honors adviser at the end of the second term of the junior year.

Related Courses in Other Departments

[New Testament Greek (Classics 202) Not offered 1979–80.]

[Introduction to Medieval Latin (Classics 214) Not offered 1979–80.]

Introduction to Classical Archaeology (Classics 220 and Art History 220)

[Minoan-Mycenaean Art and Archaeology (Classics 221) Not offered 1979–80.]

[Art and Archaeology of Archaic Greece (Classics 326) Not offered 1979–80.]

[Pagan and Christian at Rome (Classics 332) Not offered 1979–80.]

[Problems in Minoan-Mycenaean Archaeology (Classics 629) Not offered 1979–80.]

Philosophy

Courses Primarily for Undergraduates

All 200-level courses are open to freshmen. All 200- and 300-level courses are designed primarily for undergraduates. Some 300-level courses have prerequisites which instructors may waive in individual cases. Graduate students may enroll in 300-level courses unless excluded by the instructor.

100 Freshman Seminar in Philosophy Fall or spring. 3 credits. Limited to freshmen who have not taken Philosophy 101. Independent sections, each limited to 20 students.
Fall: T R 8–9:15, N. Kretzmann; M W F 9:05, staff; M W F 10:10, staff; T R 10:10–11:25, S. Shoemaker; M W F 11:15, staff; T R 12:20–1:35, G. Fine; T R 12:20–1:35, C. Ginet; T R 2:30–3:45, G. Fine. Spring: M W F 9:05, staff; M W F 10:10, staff; T R 10:10–11:25, R. Stainaker; M W F 11:15, staff; T R 12:20–1:35, staff; M W F 1:25, N. Sturgeon; T R 2:30–3:45, staff; M W F 2:30, D. Zaret.

101 Introduction to Philosophy Fall or spring. 3 credits.
Fall: T R 12:20, A. Wood. Spring: T R 10:10, N. Kretzmann.
Readings in classic works of philosophy (such as Plato, Aquinas, Descartes, Hume, Mill, Russell) concerned with central philosophical issues—foundations of knowledge, reality and illusion, the basis of morality, the existence of God.

[102 Introduction to Philosophy: Problems Not offered 1979–80.]

131 Logic: Evidence and Argument Spring. 4 credits.
M W F 9:05. J. Bennett.
An introduction to the fundamental principles of inference intended to systematize and develop skills in evaluating arguments. Deductive arguments, for which there are rigorous evaluation procedures, and inductive argument, for which no similarly rigorous procedures have yet been devised, are both considered. The course is not a general introduction to philosophy, but skills it develops are useful for all areas of study, including philosophy.

201 Philosophical Problems Spring. 4 credits.
M W F 1:25. C. Ginet.
Topic for 1979–80: Free will.

210 Ancient Thought Fall. 4 credits.
M W F 1:25. T. Irwin.
An introductory survey of major intellectual developments in the Greek and Roman world and their significance for later thought. The development of Greek scientific, moral, and political thinking; Greek and Hebrew thought; the growth of Christianity and its relations to Greek philosophy. Questions include: What is the nature of the universe, and how can it be known? What is scientific knowledge, and

how does it differ from religious belief? What can man know about God? Is there any rational basis for moral beliefs and political principles? Readings in translation are selected from Homer, the Pre-Socratic philosophers, Greek tragedy, Thucydides, Plato, Aristotle, the Stoics, Epicurus, Lucretius, Marcus Aurelius, the Hebrew Prophets, the Wisdom of Solomon, the Gospels, the Letters of St. Paul, Plotinus, St. Augustine.

[211 Ancient Philosophy Not offered 1979–80.]

212 Modern Philosophy Spring. 4 credits.
M W F 11:15. S. Shoemaker.
A survey of some major philosophical problems in the Rationalists, Empiricists, and Kant. Typical problems include: the nature and limits of knowledge; perception; the existence of God; free will and determinism; mind and body. Readings from Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant.

213 Existentialism Fall. 4 credits.
T R 10:10. A. Wood.
A study of selected writings, literary as well as philosophical, by four major thinkers to whom the term "existentialist" has often been applied: Søren Kierkegaard, Friedrich Nietzsche, Fyodor Dostoevsky, Jean-Paul Sartre.

[214 Philosophical Issues in Christian Thought Not offered 1979–80.]

231 Formal Logic Fall. 4 credits.
M W F 11:15. H. Hodes.
Analysis and evaluation of deductive reasoning in terms of formalized language. The logic of sentences and predicates.

241 Ethics Spring. 4 credits.
T R 12:20–2:15. N. Sturgeon.
Introduction to the philosophical study of moral problems and ethical theories through both historical and contemporary sources. Topics typically include: relativism and scepticism; egoism and utilitarianism; and one or more specific moral issues, such as abortion, rules of war, or reverse discrimination.

242 Social and Political Theory Fall. 4 credits.
M W F 10:10. J. Bennett.
A survey of five main problems of political philosophy: the need for the state, the moral legitimacy of the state, freedom, democracy, and economic justice. Organized around selected writings of five major political philosophers: Hobbes, Locke, Mill, Rousseau, and Marx.

[243 Aesthetics Not offered 1979–80.]

[244 Philosophy in Literature Not offered 1979–80.]

245 Biomedical Ethics
See course description under Biological Sciences 205.

246 Environmental Ethics
See course description under Biological Sciences 206.

[247 Women, Values, and Society Not offered 1979–80.]

261 Knowledge and Reality Fall. 4 credits.
M W F 9:05. R. Stalnaker.
Introduction to problems concerning the nature of knowledge, certainty and belief, cause, truth, substance, identity, essence, and abstract entities.

[262 Philosophy of Mind Not offered 1979–80.]

[263 Reason and Religion Not offered 1979–80.]

286 Science and Human Nature Spring. 4 credits.
M W F 10:10. R. Boyd, N. Sturgeon.
An examination of attempts in the biological and social sciences to offer scientific theories of human nature and human potential and to apply such theories to explain important social and psychological phenomena. Topics vary, and may include issues in psychology, such as behaviorism, Freudianism, and artificial intelligence, or issues in the foundations of historical theory, such as methodological individualism and economic determinism, as well as relevant issues in the biological sciences. Topic for 1979–80: Darwin, social Darwinism, and sociobiology.

309 Plato Spring. 4 credits.
M W F 1:25. T. Irwin.
A systematic treatment of Plato's metaphysics, epistemology, and ethics.

[310 Aristotle Not offered 1979–80.]

[311 Modern Rationalism Not offered 1979–80.]

[312 Modern Empiricism Not offered 1979–80.]

[313 Medieval Philosophy Not offered 1979–80.]

[314 Topics in Ancient Philosophy Not offered 1979–80.]

315 Special Topics in the History of Philosophy Spring. 4 credits.
T R 10:10. A. Wood.
Topic for 1979–80: The philosophy of Martin Heidegger. Readings are drawn from *Being and Time* (1927), *Introduction to Metaphysics* (1935), and possibly one or two later essays.

316 Kant Fall. 4 credits.
M W F 2:30. T. Irwin.
Introduction to Kant's main doctrines in metaphysics, theory of knowledge, and ethics. Kant's place in the history of philosophy; how he tries to reconcile and transcend the best insights of rationalism and empiricism. Kant's new philosophical perspective; can we have knowledge of the world as it really is, or can we only know our way of seeing the world? Topics include: the possibility of non-empirical knowledge and the basis of empirical knowledge; the nature of space and time and our knowledge of them; proof of the existence of an objective world (has Kant answered scepticism?); why events must have causes, and how we know they must have them; scientific law, determinism, and the possibility of free will; free will, reason, and the basis of morality.

317 Hegel Spring. 4 credits.
T R 12:20–1:35. A. Wood.
An introduction to Hegel's philosophy through study of his first systematic philosophical treatise, the *Phenomenology of Spirit*. Emphasis is given to Hegel's dialectical method, but the focus of discussion is on topics covered in the *Phenomenology*.

318 Twentieth-Century Philosophy Fall. 4 credits.
M W F 10:10. C. Ginet.
Topic for 1979–80: The logical atomism of Russell and Wittgenstein.

[319 Philosophy of Marx Not offered 1979–80.]

331 Introduction to Formal Logic Spring. 4 credits.
M W F 10:10. R. Stalnaker.
Sentential logic and first order quantification theory. Covers the same material as Philosophy 231, but in more depth and with additional metatheory.

[332 Semantics Not offered 1979–80.]

341 Ethical Theory Spring. 4 credits. Prerequisite: one course in philosophy.
M W F 11:15. J. Bennett.
A thorough study of the major ethical theories and the major theories of the nature and justification of ethical theories. Emphasis is on contemporary treatment of the issues, although the readings are a mix of contemporary and historically important authors.

342 Law, Society, and Morality Fall. 4 credits.
Prerequisite: one course in philosophy or one course with related subject matter.
M W F 11:15. D. Lyons.
An introduction to legal and political philosophy emphasizing the nature of law, the problem of coercion, principles of justice, and general welfare.

361 Metaphysics and Epistemology Spring. 4 credits. Prerequisite: one course in philosophy.
T R 2:30–3:45. S. Shoemaker.
Topic for 1979–80: The later philosophy of Wittgenstein.

363 Topics in the Philosophy of Religon Fall. 4 credits.
T R 2:30–3:45. N. Kretzmann.
Topic for 1979–80: The problem of evil. The problem of reconciling the existence of evil with the existence of an omniscient, omnipotent, perfectly good God is the central concern of the course, but the consideration of that problem leads to the consideration of such other topics as arguments for (and against) the existence of God, divine foreknowledge and human freedom, divine eternality and human temporality.

381 Philosophy of Science Spring. 4 credits.
W 7:30–10:30 p.m. R. Boyd.
An examination of central epistemological and metaphysical issues raised by scientific theorizing: the nature of evidence, scientific objectivity, the nature of theories, "models" and paradigms, the character of the scientific revolution, etc. In addition to the contemporary literature in the philosophy of science, readings are also drawn from the history of science and from the works of modern philosophers, such as Locke, Hume, and Descartes, who addressed issues relevant to the philosophy of science.

[383 Philosophy of Choice and Decision Not offered 1979–80.]

387 Philosophy of Mathematics Spring. 4 credits.
Prerequisites: one course in philosophy and some background in logic.
T R 10:10–11:25. H. Hodes.
The relation between mathematics and logic; the relation between the natural numbers and other mathematical systems. Emphasis on the writings of Frege.

[388 Social Theory Not offered 1979–80.]

390 Informal Study Fall or spring. Credit to be arranged. To be taken only in exceptional circumstances. Must be arranged by the student with his or her adviser and the faculty member who has agreed to direct the study.
Staff.

Advanced Courses and Seminars

All 400-level courses are designed primarily for advanced undergraduates, philosophy majors, and graduate students; they include both lecture courses and seminars. All 600-level courses are seminars designed primarily for graduate students. The 400- and 600-level courses are open to other students only with permission of the instructor.

412 Medieval Philosophy Spring. 4 credits.
T R 2:30–3:45. N. Kretzmann.
Topic for 1979–80 to be announced.

413 Plato and Aristotle Fall. 4 credits.
M 3:45–5:40. G. Fine.
Topic for 1979–80 to be announced.

[431 Deductive Logic Not offered 1979–80.]

[432 Deductive Logic Not offered 1979–80.]

[433 Philosophy of Logic Not offered 1979–80.]

[435 Inductive Logic Not offered 1979–80.]

436 Intensional Logic Fall. 4 credits. Prerequisite: Philosophy 231 or equivalent.
M W F 1:25. R. Stalnaker.
Formal semantics for, and philosophical applications of, various modal and intensional logics.

437 Problems in the Philosophy of Language Fall. 4 credits. Prerequisites: one course in philosophy and background in logic.
T R 12:20–1:35. H. Hodes.
Selected topics in philosophy of language, examined in a historical setting. Readings from Frege, Russell, Carnap, Quine, Davidson, Chomsky, and others. Topics include reference, analyticity, translation, referential opacity, and the relation between semantics and other sciences.

[441 Contemporary Ethical Theory Not offered 1979–80.]

[442 Problems in Ethics and Philosophy of Mind Not offered 1979–80.]

[443 Topics in Aesthetics Not offered 1979–80.]

444 Contemporary Legal Theory (also Law 525) Spring. 4 credits.
T R 3:45–5. D. Lyons.
An intensive study of two leading theories of law, concentrating on Hart's *Concept of Law* and Dworkin's *Taking Rights Seriously*. Topics include: legal positivism and the rights thesis, judicial reasoning and discretion, legal rules and principles, legal and moral obligations, rights and goals, the separation of law and morals.

[461 Metaphysics Not offered 1979–80.]

462 Theory of Knowledge Spring. 4 credits.
T R 3:45–5. C. Ginet.
Topic for 1979–80: The general definition of knowledge, perceptual knowledge, and memory knowledge.

481 Problems in the Philosophy of Science Fall. 4 credits.
M W F 11:15. D. Zaret.
Topic for 1979: Philosophy of space and time.

490 Special Studies in Philosophy Fall or spring. 4 credits. Open only to honors students in their senior year.
Staff.

611 Ancient Philosophy Spring. 4 credits.
M 3:45–5:40. T. H. Irwin.
Topic for 1979–80: Greek ethics and modern ethics (with special reference to Aristotle's *Ethics* and *Politics*).

[612 Medieval Philosophy Not offered 1979–80.]

613 Modern Philosophers Spring. 4 credits.
W 3:45–5:40. A. Wood.
Topic for 1979–80: Kant's ethics.

[619 History of Philosophy Not offered 1979–80.]

[631 Logic Not offered 1979–80.]

[632 Semantics Not offered 1979–80.]

633 Philosophy of Language Fall. 4 credits.
W 3:45–5:40. J. Bennett.
An investigation of recent philosophical attempts to apply standard philosophical theories of language to a broader range of symbolic phenomena. A major part of the seminar is devoted to Nelson Goodman's *Languages of Art* and related discussions; additional topics may include measurement and modeling in science, symbol and allegory in literature, and recent philosophical views about the nature of meaning.

[641 Ethics and Value Theory Not offered 1979–80.]

[661 Theory of Knowledge Not offered 1979–80.]

662 Philosophy of Mind Fall. 4 credits.
R 3:45–5:40. S. Shoemaker.
Topic for 1979–80: Functionalism and its critics.

[664–665 Metaphysics Not offered 1979–80.]

[681 Philosophy of Science Not offered 1979–80.]

[682 Philosophy of Social Sciences Not offered 1979–80.]

700 Informal Study Fall or spring. Credit to be arranged. To be taken by graduate students only in exceptional circumstances and by arrangement made by the student with his or her special committee and the faculty member who has agreed to direct the study.
Staff.

Related Courses in Other Departments

The Nature of Religious Experience (Asian Studies 250)

Introduction to Asian Religions (Asian Studies 351)

American Legal Theory (Law School)

Elementary Mathematical Logic (Mathematics 381)

Set Theory (Mathematics 687)

Hermeneutics (Comparative Literature 699)

The Marxian Legacy (Society for the Humanities 422)

Marx and Socialist Thought (Government 376)

Nineteenth-Century Social Thought (Government 669)

Twentieth-Century Social Thought (Government 670)

Physics

101–102 General Physics 101, fall, except by special permission; 102, spring. May also be offered during summer session. 4 credits each term. Prerequisites: three years of high school mathematics, including some trigonometry. Prerequisite for Physics 102: 101 or 112 or 207. Includes more modern physics and less mathematical analysis than Physics 207–208 or 112–213–214, but more mathematics than courses in Physics 201 to 205. Students planning to major in a physical science should elect Physics 207–208 or 112–213–214. A self-paced, mastery-oriented audiotutorial format; students work in a learning center at hours of their own choice. Repeated tests on each unit are given until mastery is demonstrated.
One large orientation meeting on Tuesday, September 4, 10:10 or 12:20 or Wednesday, January 23, 7:30 p.m. E. Richardson and staff.
Basic principles treated quantitatively but without calculus. Major topics for Physics 101: particle structure of matter; kinematics; forces and fields (including electric fields); momentum, angular momentum, energy (including nuclear energy); relativity; sound waves. Physics 102: electricity and magnetism; optics; thermal physics; quantum physics. Laboratory emphasizes instrumentation, measurement, and interpretation of data. Text: *Physics for College Students—with Applications to the Life Sciences* by Tilley and Thumm.

112 Physics I: Mechanics and Heat Fall or spring. May also be offered during summer session. 4 credits. Primarily for students of engineering and for prospective physics majors. Prerequisite: coregistration in Mathematics 192 (or 194 or 112), or substantial previous contact with introductory calculus, combined with coregistration in Mathematics 191 (or 193 or 111).
Lec, M W 10:10 or 12:20; 2 rec each week; one 2-hour lab alternate weeks. Evening exams: fall, Oct. 11, Nov. 15; spring, Feb. 26, April 3. Fall, D. Yennie.
Mechanics of particles: kinematics, dynamics, special relativity, conservation laws, central force fields, periodic motion. Mechanics of many-particle systems: center of mass, rotational mechanics of a rigid body, static equilibrium. Introduction to thermodynamics. At the level of *Physics* by Tipler.

201 Great Ideas of Physics Fall. 3 credits. Intended for nonscientists; does not serve as a prerequisite to further science courses. Assumes no scientific background, but may use some high school mathematics.
Lec, M W F 2:30; discussion to be arranged. H. Mahr.
Students investigate the basic concepts involved in some of the milestones in the evolution of physics. Topics are selected from Newtonian mechanics, special relativity, gravitation, the nature of light, quantum theory, and the indeterminancy principle.

202 Physics in the World Around Us Spring. 3 credits. Intended for nonscientists; does not serve as a prerequisite to further science courses. Assumes no scientific background, but may use some high school mathematics.
Lec, M W F 2:30; discussion to be arranged. H. Mahr.
Students investigate the principles of physics and their applications to explain phenomena in the physical world around us, in biology, and in astronomy. The level of the course is that of a typical article in the *Scientific American*.

203 The Physics of Space Exploration Spring. 3 credits. Intended for nonscientists; does not serve as a prerequisite for further science courses. Assumes no scientific background, but may use some high school mathematics.
Lec, M W F 2:30. E. Salpeter.
The principles of physics (plus simple mathematics) are applied to gain knowledge about planets and stars. The physics behind space probes (and their limitations) is discussed. Interpretation of data from space probes and from earthbound observations are described. The level of the course will be that of a typical article in *Scientific American* and of Pasachoff's *Astronomy Now*.

204 Physics of Musical Sound Fall. 3 credits. Intended for nonscientists; does not serve as a prerequisite for further science courses. Assumes no scientific background, but will use some high school algebra.
Lec, M W F 2:30; discussion to be arranged. R. H. Silsbee.
The basic physical characterization of sound in terms of pitch, intensity, and tone quality is developed, as well as the important concepts necessary to understand many features of the production, propagation, and perception of sound. Among the specific topics that are discussed are mechanisms of tone production in musical instruments, speculations as to the basis of consonance and dissonance, the

structure of musical scales, architectural acoustics, and the principles of electronic synthesis of musical sound.

[**205 Energy** Not offered 1979–80.]

207–208 Fundamentals of Physics 207, fall; 208, spring. 4 credits each term. Prerequisites for Physics 207: high school physics plus coregistration in Mathematics 192 or 112, or substantial previous contact with introductory calculus, combined with coregistration in Math 191 or 111. Prerequisites for Physics 208: Physics 207 (or 112 or 101) and at least coregistration in Mathematics 192 or 112. Physics 207–208 is intended as the first college physics course for students majoring in a physical science, mathematics, or an analytically oriented biological science.

Lec, M W 9:05 or 11:15; 2 rec each week; one 3-hour lab alternate weeks. Evening exams: fall, Oct. 9, Nov. 15; spring, Feb. 28, April 3. Fall, R. Cotts; spring, R. Pohl.

Core-plus-branch plan. The first nine weeks of each semester are devoted to core material (lec/discussion/lab format): 207, particle mechanics and waves; 208, electromagnetic fields and circuits. For the last five weeks each term, each student selects one branch topic and the work on this topic is done on an unstructured, self-paced basis. Possible branches: 207, thermodynamics, acoustics and the physics of music, special relativity, gravitation; 208 optics, introduction to quantum mechanics, nuclear physics, electronics. Core at the level of *Physics* by P. A. Tipler.

213 Physics II: Electricity and Magnetism Fall or spring. May also be offered during summer session. 4 credits. Primarily for students of engineering and for prospective physics majors. Prerequisites: Physics 112 and coregistration in the continuation of the mathematics sequence required for 112.

Lec, T R 9:05 or 11:15; 2 rec each week; one 3-hour lab alternate weeks. Evening exams: fall, Oct. 4, Nov. 8, Dec. 6; spring, Feb. 28, Apr. 3, May 1. Fall, H. Newhall.

Electrostatics, behavior of matter in electric fields, magnetic fields, Faraday's law, electromagnetic oscillations and waves, magnetism. At the level of *Physics* by Tipler. Lab work supplements written and oral work: electrical measurements, dc and ac circuits, resonance phenomena.

214 Physics III: Optics, Waves, and Particles Fall or spring. May also be offered during summer session. 3 or 4 credits. Primarily for students of engineering and for prospective physics majors. Prerequisites: Physics 213 and coregistration in the continuation of the math sequence required for 112. (Physics 310 may be taken, with permission of the instructor, in place of the Physics 214 lab and credit for 214 is reduced to 3 credits.)

Lec, T R 9:05 or 11:15; 2 rec each week; one 3-hour lab alternate weeks. Evening exams: fall, Oct. 2, Nov. 6, Dec. 4; spring, Feb. 21, March 13, April 10. Fall, R. Richardson; spring, D. Holcomb.

Wave phenomena; electromagnetic waves; physical optics; quantum effects, matter waves; uncertainty principle; introduction to wave mechanics, elementary applications.

217 Physics II: Electricity and Magnetism Fall or spring. 4 credits. Intended for students who have done very well in Physics 112 and desire a more analytic treatment than that of Physics 213. Prospective physics majors are encouraged to select Physics 217. Prerequisites: permission of the instructor and approval of the student's adviser before course enrollment. Prerequisites also include a knowledge of the fundamentals of electricity and magnetism and a good mathematical background, including the use of vector calculus.

Lec, T R S 11:15; rec, T 3:35; lab, R 1:30–4:30. Evening exams may be scheduled.

A more rigorous version of Physics 213, at the level of *Electricity and Magnetism* by Purcell (Vol II, Berkeley Physics Series).

218 Physics III: Optics, Waves, and Particles Fall or spring. 3 or 4 credits. A special section of Physics 214. Conditions governing enrollment are similar to those of Physics 217. Students are required to do the lab work offered in 214 or to enroll concurrently in Physics 310 (in which case credit for Physics 218 is reduced to 3 credits).

Lec, T R S 11:15; section T 2:30; lab, see Physics 214 or 310. Evening exams may be scheduled. Fall, K. Berkelman; spring, J. Orear.

310 Intermediate Experimental Physics Fall or spring. 3 credits. Prerequisite: Physics 208 or 213. May be taken concurrently with 214 or 218 in place of the lab work offered in Physics 214, with consent of student's adviser.

Lab, T W or R F 1:25–4:25. J. DeWire and staff.

Students select from a variety of experiments and may work on experiments of their own design if equipment is available. An individual, independent approach is encouraged. Facilities of the Physics 410 lab are available for some experiments.

315 Phenomena of Microphysics Fall or spring. 3 credits. Primarily for students of engineering and prospective majors in physics. Prerequisites: Physics 214 and Mathematics 294.

Fall: lec, M W F 9:05; E. Siggia. Spring: T R S 11:15; J. Scott.

Introduction to the physics of atoms, solids, and nuclei, emphasizing the description of phenomena using the results of elementary quantum and statistical physics. At the level of *Fundamental University Physics*, Vol. III, by Alonso and Finn.

318 Analytical Mechanics Spring. 4 credits. Prerequisites: Physics 208 or 214 plus one of Mathematics 421, 422, or 423, or permission of instructor. Intended for physics majors concentrating in physics. Similar material is covered in Physics 431 at a less demanding analytical level. (Applied and Engineering Physics 333 is approximately equivalent.)

Lec, M 11:15–1:15, W F 11:15. R. Cotts.

Newtonian mechanics of particles and systems of particles including rigid bodies; oscillating systems; gravitation and planetary motion; moving coordinate systems, relativistic kinematics; wave propagation; Euler's equations; Lagrange's equations; Hamilton's equations; normal modes and small vibrations. At the level of *Introduction to the Principles of Mechanics* by Hauser.

325 Electricity and Magnetism Fall. 4 credits. Prerequisites: Physics 208 or 214 plus coregistration in one of Mathematics 421, 422, or 423, or permission of instructor. Intended for physics majors concentrating in physics. Similar material is covered in Physics 432 at a less demanding analytical level.

Lec, T R S 11:15, R 1:25. A. Sievers.

Electrostatics: electric charge and fields, potential, multipoles, conductors, Laplace equation and formal solutions, field energy, dielectric materials, polarization. Magnetostatics: currents, magnetic fields and vector potential, magnetic materials, field energy. Maxwell's equations, Poynting vector. Electrodynamics: plane waves, fields from moving and oscillating charges. At the level of *Lectures on Physics*, Vol. II, by Feynman and *Foundations of Electromagnetic Theory* by Reitz and Milford.

326 Electromagnetic Waves and Physical Optics Spring. 4 credits. Prerequisite: Physics 325.

Lec, T R S 9:05, W 1:25. A. Sievers.

Electrodynamics: applications of Maxwell's equations, wave equation, transmission lines, wave guides, radiation, special relativity. Physical optics: reflection, refraction, dispersion, polarization, Fresnel and Fraunhofer diffraction. At the level of *Classical Electromagnetic Radiation* by Marion.

330 Modern Experimental Optics Spring. 3 credits. Prerequisite: one year of physics.

Lec, M 2:30; lab, T W R or F 1:25–4:15.

A practical, lab-based course for students of physical and biological sciences. Students select four or five subject units to match their interests and backgrounds. The units include: physics of lasers, image formation, holography, spectroscopy, light pulses, coherence and correlation, diffraction and interference, light sources and detectors. Each unit involves one or more experiments from a set of varying difficulty and sophistication, and readings, supplementary notes, and problems. An introduction to modern optical techniques and equipment used in current research in such fields as biology, chemistry, physics, and astronomy.

341 Themodynamics and Statistical Physics Fall. 4 credits. Prerequisites: Physics 214 and Mathematics 294.

Lec, T R S 9:05, T 2:30. D. Lee.

Statistical physics, developing both thermodynamics and statistical mechanics simultaneously. Concepts of temperature, laws of thermodynamics, entropy, thermodynamic relations, free energy. Applications to phase equilibrium, multicomponent systems, chemical reactions and thermodynamic cycles. Application of statistical mechanics to physical systems; introduction to treatment of Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics with applications. Elementary transport theory. At the level of *Fundamentals of Statistical and Thermal Physics* by Reif or *Thermal Physics* by Morse.

360 Introductory Electronics (also Engineering A&EP 363) Fall or spring. 4 credits. Prerequisite: Physics 208 or 213 or permission of instructor; no previous experience with electronic circuits is assumed; however, the course moves through the introductory topics (dc and ac circuits, basic circuit elements) rather quickly. Students wishing a somewhat slower-paced treatment might consider taking Electrical Engineering 210 before Physics 360.

Lec, M 2:30–4:25; lab, T R or W F 1:25–4:25. Fall, R. Littauer; spring, A. Kuckes.

Basic analysis and design of semiconductor circuits useful in electronic instrumentation, such as: amplifiers; oscillators and waveform generators; switching, digital, and timing circuits; power supplies. Course notes are supplied; the level is that of *Electronic Measurements for Scientists*, by Malmstadt, Enke, and Crouch. This text is not followed in detail and is not required reading.

400 Informal Advanced Laboratory Fall or spring. May also be offered during summer session. Variable credit. Prerequisite: two years of physics and permission of instructor.

Lab, see Physics 410.

Experiments of widely varying difficulty in one or more areas, as listed under Physics 410, may be done to fill the student's special requirements.

410 Advanced Experimental Physics Fall or spring. 4 credits. Limited to seniors except by special permission. Prerequisites: Physics 214 (or 310 or 360) plus 318 and 325, or permission of instructor.

Lec, M 2:30–4:25; lab, T W 1:25–4:25. Fall, R. Sieman and staff; spring, S. Gregory and staff.

Selected topics in experimental concepts and techniques. About seventy different experiments are available in mechanics, acoustics, optics, spectroscopy, electrical circuits, electron and ion physics, heat, X rays and crystal structure, solid-state physics, cosmic rays, and nuclear physics. The student performs three to six diverse experiments, depending on difficulty, selected to meet individual needs and interests. Independent work is stressed.

431–432 Introductory Theoretical Physics I and II 431, fall; 432, spring. 4 credits each term. Prerequisites: Physics 431 and 207–208 plus Mathematics 294 or equivalent and Mathematics 431

and 432 or equivalent; or permission of instructor. Primarily for physics majors with concentrations outside physics, and for graduate students in a science other than physics (such as chemistry, engineering, biology, geology). Physics 318 and 325 cover similar material at a higher analytical level, and are intended for physics majors concentrating in physics.

Lec, M W F S 11:15. Fall, K. Gottfried; spring, R. Talman.

Physics 431: mechanics. Includes Newtonian mechanics, Lagrange's and Hamilton's equations, central forces, rigid-body motion, and small oscillations. At the level of *Classical Dynamics* by Marion. 432: electricity and magnetism. Includes electrostatics, magnetostatics, boundary value problems, dielectric and magnetic media, circuit theory, Maxwell's equations, and electromagnetic waves. At the level of *Electricity and Magnetism*, third ed., by Bleaney and Bleaney.

443 Introductory Quantum Mechanics Fall. 4 credits. Prerequisites: Physics 318 and 325, or 431–432; Physics 315, and Mathematics 421; or permission of instructor.

Lec, M W F 9:05, M 3:35. V. Ambegaokar.

Introduction to concepts and techniques of quantum mechanics, at the level of *Introduction of Quantum Mechanics*, by Dicke and Wittke.

444 Nuclear and High-Energy Particle Physics Spring. 4 credits. Prerequisite: Physics 443 or permission of instructor.

Lec, M W F 9:05, F 1:25. M. Gilchriese.

Behavior of high-energy particles and radiation; elementary particles; basic properties of nuclei; nuclear reactions; nuclear forces; cosmic rays; general symmetries and conservation laws. At the level of *Subatomic Physics* by Frauenfelder and Henley.

454 Introductory Solid State Physics Spring. 4 credits. Prerequisite: Physics 443 or Chemistry 793, or permission of instructor.

Lec, T R S 10:10, R 3:35. R. Silsbee.

An introduction to modern solid-state physics, including lattice structure, lattice vibrations, thermal properties, electron theory of metals and semiconductors, magnetic properties, and superconductivity. At the level of *Introduction to Solid State Physics*, fifth edition, by C. Kittel.

[464 Physics of Macromolecules Not offered 1979–80.]

481–489 Special Topics Seminar Spring. 2 credits. S-U grades only. Limited to senior physics majors and those who receive permission of instructor.

F 2:30–4:25.

One selected topic of current interest is studied. Students participate in organization and presentation of material.

490 Independent Study in Physics Fall or spring. 1–3 credits. Ordinarily limited to seniors. Prerequisite: permission of professor who will direct proposed work.

Individual project work (reading or laboratory) in any branch of physics.

500 Informal Graduate Laboratory Fall or spring. Variable credit.

505–506 Design of Electronic Circuitry 505, fall; 506, spring. 3 credits.

T R 10:10. Fall, P. Stein; spring, D. Hartill.

Circuit techniques and design in electronic measurement and instrumentation with emphasis on applications to physics experiments. At the level of *Integrated Electronics* by Millman and Halkias.

510 Advanced Experimental Physics Fall or spring. 3 credits.

Lab, T W 1:25–4:25. Fall, R. Siemann and staff; spring, S. Gregory and staff.

About seventy different experiments are available in mechanics, acoustics, optics, spectroscopy, electrical circuits, electronics and ionics, heat, x rays, crystal structure, solid-state, cosmic rays, nuclear physics. Students perform four to eight experiments selected to meet individual needs. Independent work is stressed.

520 Projects in Experimental Physics Fall or spring. 1–3 credits. To be supervised by faculty member.

Projects of modern topical interest that involve some independent development work by student. Opportunity for more initiative in experimental work than is possible in Physics 510.

551 Classical Mechanics Fall. 3 credits.

Lec, T R S 10:10. J. Krumhansl.

Lagrangian and Hamiltonian formulation of classical mechanics. At the level of *Mechanics* by Landau and Lifshitz.

[553–554 General Relativity (also Astronomy 509–510) Not offered 1979–80.]

561 Classical Electrodynamics Fall. 3 credits.

Lec, M W F 10:10. S. Teukolsky.

Maxwell's equations, electromagnetic potentials, electrodynamics of continuous media (selected topics), special relativity, radiation theory. At the level of *Classical Electrodynamics* by Jackson.

562 Statistical Mechanics (also Chemistry 796) Spring. 4 credits. Primarily for graduate students. Prerequisite: Chemistry 793 or equivalent.

Lec, T R 8–9:50. B. Widom.

Ensembles and partition functions. Thermodynamic properties of ideal gases and crystals. Third law of thermodynamics, equilibrium constants, vapor pressures, imperfect gases, and virial coefficients. Distribution and correlation functions, structure and properties of liquids. Lattice statistics and phase transition. Bose-Einstein and Fermi-Dirac ideal gases. At the level of McQuarrie's *Mechanics*.

572 Quantum Mechanics I Fall or spring. 4 credits.

Lec, M W F 11:15. Fall, D. Mermin; spring, T. Yan.

The formulation of quantum mechanics in terms of states and operators. Symmetries and the theory of angular momentum. Stationary and time dependent perturbation theory, Fermi's golden rule, and variational methods. The elements of scattering theory. At a level between *Quantum Mechanics* by Merzbacher and *Quantum Mechanics* by Landau and Lifshitz. Familiarity with elementary aspects of the Schroedinger equation is assumed, including its application to simple systems such as the hydrogen atom.

574 Quantum Mechanics II Spring. 4 credits. Required of all Ph.D. majors in theoretical physics.

Lec, M W F 11:15. V. Ambegaokar.

Discussion of various applications of quantum mechanics, such as collision theory, theory of spectra of atoms and molecules, theory of solids, emission of radiation, relativistic quantum mechanics. At the level of *Intermediate Quantum Mechanics* by Bethe and Jackiw.

[612 Experimental Atomic and Solid-State Physics Not offered 1979–80.]

614 Experimental High-Energy Physics Spring. 3 credits.

Lec, M W F 1:25. R. Siemann.

Design principles of high-energy apparatus including beam transport and detection systems, with examples of their applications. Practice in use of relativistic kinematics. Statistical analysis in design and interpretation of experiments.

635 Solid-State Physics I Fall. 3 credits. First semester of a two-semester sequence of solid-state physics for graduate students who have had the equivalent of Physics 572 and 562.

Lec, T R S 11:15. N. Ashcroft.

Electronic and phonon properties of metals and insulators, including transport processes. Discussions at a level slightly above that of *Solid State Physics* by N. W. Ashcroft and N. D. Mermin.

636 Solid-State Physics II Spring. 3 credits.

Lec, T R 2:30–4. V. Ambegaokar.

Concepts developed in Physics 635 are extended and applied in a survey of the following: band theory and Fermi surface in metals, localized states, magnetism, neutron and light scattering, phenomenological superconductivity, and other topics of current interest in condensed-matter physics.

645 High-Energy Particle Physics Fall. 3 credits.

Lec, T R 2:30–4. L. Hand.

Introduction to the physics of nucleons and mesons. Strong, electromagenetic, and weak interactions. Relevance of symmetry laws to particle physics. Introduction to the quark model. Unification of weak and electromagnetic interactions. At the level of *Introduction to High Energy Physics* by Perkins.

646 High-Energy Particle Physics Spring. 3 credits.

Lec, T R 2:30–4. B. Gittelman.

Topics of current interest, including hadron electroproduction, electron positron annihilation, and high energy neutrino reaction, are surveyed. Lectures and reading material are at the level of *High Energy Hadron Physics* by Perl. Students share in leading the discussions.

Only S-U grades will be given in courses numbered 650 or above.

651 Advanced Quantum Mechanics Fall. 3 credits.

Lec, T R 12:50–2:15. T. Kinoshita.

Relativistic quantum mechanics with emphasis on perturbation techniques. Extensive applications to quantum electrodynamics. Introduction to renormalization theory. At the level of *Relativistic Quantum Mechanics* by Bjorken and Drell.

652 Quantum Field Theory Spring. 3 credits.

Lec, M W F 10:10. D. Yennie.

Canonical field theory, model field theories, Green's functions, renormalization. Introduction to analytic properties of scattering amplitudes and dispersion relations. Applications to strong interactions. At the level of *Relativistic Quantum Fields* by Bjorken and Drell.

653 Statistical Physics Fall. 3 credits. Normally taken by students in their second or later years. Prerequisites: competence in the basic principles of quantum mechanics, statistical mechanics, and thermodynamics.

Lec, M W F 9:05. M. Nelkin.

Survey of topics in modern statistical physics including the theory of simple classical and quantum fluids; the theory of ordered systems such as superfluids and superconductors; kinetic theory and the Boltzmann equation; phenomenological Fermi liquid theory and hydrodynamics; theories of inhomogeneous systems. The contents of the course vary with the current interests of the instructor. There is rarely any set text, though *Statistical Physics* by Landau and Lifshitz gives an idea of the level.

654 Theory of Many-Particle Systems Spring. 3 credits.

Lec, T R 10:10–11:35. E. Siggia.

Equilibrium and transport properties of microscopic systems of many particles studied at zero and finite temperatures. Thermodynamic Green's function techniques introduced and applied to such topics as normal and superconducting Fermi systems, superfluidity, magnetism, insulating crystals.

661 High-Energy Phenomena Fall. 3 credits.
Lec, M R F 3:35. T. M. Yan.
Topics vary at the discretion of the instructor.

[665 Topics in Theoretical Astrophysics (also Astronomy 555) Not offered 1979–80. Usually offered during the fall term of even calendar years.]

667 Theory of Stellar Structure and Evolution (also Astronomy 560) Fall. 4 credits. Usually offered during the fall term of odd calendar years.
Lec, M W F 2:30. E. Salpeter.
Summary of observational facts on stars; dimensional analysis; nuclear reactions and energy, transport in stellar interiors; models for static and evolving stars. At the level of *Principles of Stellar Energy and Nucleosynthesis* by Clayton.

681–689 Special Topics
Offerings are announced each term. Typical topics are: group theory, analyticity in particle physics, weak interactions, superfluids, stellar evolution, plasma physics, cosmic rays, general relativity, low-temperature physics, x-ray spectroscopy or diffraction, magnetic resonance, phase transitions and the renormalization group.

690 Independent Study in Physics Fall or spring. Variable credit.
Special graduate study in some branch of physics, either theoretical or experimental, under the direction of any professional member of the staff.

Psychology

101 Introduction to Psychology: The Frontiers of Psychological Inquiry Fall. 4 credits. Students may not receive credit for both Psychology 101 and Education 110.
M W F 10:10; seminar to be arranged. J. Maas.
The study of human behavior. Topics include sleep and dreaming, brain control, psychological testing, perception, learning, motivation, abnormal behavior, psychotherapy, and other aspects of applied psychology. Emphasis is on developing skills to critically evaluate claims made about human behavior.

123 Introduction to Psychology: Biopsychology Fall. 3 credits. May not be taken for credit by students who are registered in or have completed one or more courses offered by the Section of Neurobiology and Behavior of the Division of Biological Sciences, or two or more biopsychology courses.
T R 9:05; section to be arranged. E. Adkins and staff.
A survey of behavior emphasizing evolutionary and physiological approaches, designed to introduce students to the interface between biology and psychology. Both human and nonhuman behavior is included, together with theoretical issues pertaining to the application of biological principles to human behavior. Films, discussion.

128 Understanding Personality and Social Behavior Spring. 4 credits. Limited to 450 students.
M W F 10:10, seminar to be arranged. S. C. Jones.
An examination of personality and social influences on the individual's relationship to self and environment. Both classic and contemporary viewpoints are considered and evaluated in the light of empirical evidence and critical thought.

190 Thought and Intelligence Spring. 4 credits. Open to juniors and seniors in any field, or to freshmen and sophomores who have had at least one course in psychology.
M W F 9:05. U. Neisser.
The concepts underlying the measurement of intelligence and the problems involved in interpreting such measurements are considered in the context of psychological studies of problem solving and thinking. Topics include: introspective accounts of thought, experiments on problem solving and concept formation, cross-cultural studies of thinking, the history of the concept of intelligence, reliability and validity of tests, heritability of intelligence, and recent relevant research.

201 Introduction to Psychology as a Laboratory Science Fall. 3 credits. Prerequisite: one course in psychology (normally Psychology 101, 123, 128, or 190). High school credit in psychology may meet this prerequisite with permission of instructor.
Lec, M W 10:10; lab, T or R, 10:10–12 or M or W 12:20–2:15. D. Zahorik.
Basic concepts of measurement, research design, and the relation between theory and experiment are emphasized. Experiments are from several areas of psychology and are designed to provide experience with some of the most useful psychological research procedures.

205 Perception Spring. 3 credits. Limited to 65 students.
M W F 10:10. S. Runeson.
Basic concepts and phenomena in the psychology of perception, with emphasis on the stimulus variables and sensory mechanisms involved. Visual and auditory perception are discussed in detail, and some attention is paid to other senses.

206 Psychology in Business and Industry (also Hotel Administration 314) Spring. 3 credits. Limited to 35 psychology students. Prerequisites: Psychology 101, 123, 128, or 190, or permission of instructor. Not recommended for upperclass students in ILR.
M W F 12:20. S. Davis.
The principles of psychology applied to industrial and business systems; personnel selection; placement and training; problems of people at work including evaluation, motivation, efficiency, and fatigue; and the social psychology of the work organization.

207 Motivation Theory: Contemporary Approaches and Applications Fall. 4 credits. Prerequisite: an introductory psychology course; Psychology 201 is recommended but not required. Offered alternate years. Not offered 1980–81.
T R 10:10–12:05; periodic demonstration-discussion sections. A. W. Boykin.
Models and research in human motivation are examined and integrated. Traditional approaches are used as departure points for the study of more current themes, such as intrinsic motivation and achievement motivation. Attention is given to how pertinent various themes are to real-life behavioral settings.

209 Developmental Psychology Spring. 4 credits. Prerequisite: an introductory psychology course.
M W F 9:05; section to be arranged. F. Keil.
A comprehensive introduction to current thinking and research in developmental psychology. Topics include perceptual and cognitive development in infancy and childhood, attachment, language development, Piagetan theory and research, moral development, cross-cultural perspectives, and socialization.

[214 Introduction to Cognitive Psychology Fall. 3 credits. Prerequisite: one course in psychology. Not offered 1979–80; next offered 1980–81.
M W F 11:15. L. Cooper.
An introduction to psychology emphasizing the perceptual and cognitive processes that underlie human behavior. The course is designed to introduce the student to topics such as perception, memory, language, thinking, development, problem solving, and decision making, and to discuss techniques for investigating problems in these areas.]

215 Introduction to Linguistics and Psychology Fall. 3 or 4 credits. The 4-credit option involves a laboratory project or paper. Open to first-year students by permission of instructor.
T R 12:20–2:15. S. Shattuck-Hufnagel.
Topics covered include the nature of language, its acquisition, and the influence of the grammar of a language on the psychological processes of perception, memory, and production of sentences.

275 Introduction to Personality Psychology Fall. 3 or 4 credits. Prerequisite: an introductory psychology course.
M W F 10:10; section to be arranged. D. Bem.
An introduction to research and theory in personality psychology, emphasizing contemporary approaches. Topics include the dynamics, structure, and assessment of personality as well as personality development and change. Biological and sociocultural influences on personality are also considered.

277 Psychology of Sex Roles (also Women's Studies 277 and Sociology 277) Spring. 3 or 4 credits. Prerequisite: an introductory psychology course.
T R 10:10–11:30. S. Bem.
The course addresses the question of why and how adult women and men come to differ in their overall life styles, work and family roles, personality patterns, cognitive abilities, etc. This broad question is examined from five perspectives: (a) the psychoanalytic perspective, (b) the biological perspective, (c) the historical/cultural evolutionary perspective, (d) the child development perspective, and (e) the social psychological/contemporaneous perspective. Each of these perspectives also bears on more specialized phenomena relating to the psychology of sex roles, including psychological androgyny, women's conflict over achievement, the male sex role, equalitarian marriage relationships, female sexuality, homosexuality, and transsexualism.

280 Social Influence Processes: Attitude and Behavior Change (also Sociology 280) Spring. 3 credits.
T R 10:10–11:25. D. Regan.
Intended to provide an extensive review of the literature on social influence processes. Beginning with the effects of the mere presence of others on behavior, we will discuss theory and empirical research related to conformity, compliance, group decision making, and attitude change. The relationship between attitudes and behavior is examined in detail, and application will be made to naturally occurring social influence situations.

[281 Interpersonal Relations and Group Processes (also Sociology 281) Fall. 4 credits. Not offered 1979–80; next offered 1980–81.
Lec, M W F 11:15; lab-discussion, two-hour period to be arranged. L. Meltzer.
Shyness and assertiveness, productive and defensive communication, participation and alienation, conflict and harmony, social pressures, group decision-making, leadership, group emotionality, nonverbal communication, and social skills. The laboratory will involve the class in self-study exercises. Students also work outside of class, in groups of four or five, on a term project having two aspects: research on one of the above topics and self-study of the group processes which occur during the conduct of the project. The combination throughout the course of academic and experiential approaches should develop sensitivity to group processes and to the effects we ourselves have on other persons.]

[289 Conformity and Deviance (also Sociology 289) Spring. 4 credits. Prerequisite: one course in psychology or sociology. T R 2:30–4; section to be arranged. R. Kraut. Not offered 1979–80; next offered 1980–81.]

303 Learning Spring. 3 credits. Prerequisite: Psychology 201 or a 300-level laboratory course in psychology.
T R 9:05. D. Zahorik.
The fundamental conditions and principles of learning, with emphasis on the basic phenomena of classical and operant conditioning. Traditional and contemporary theories of learning are reviewed, and selected experimental literature is discussed. Emphasis is on recent developments in the field.

[305 Visual Perception Spring. 3 or 4 credits depending on whether the student chooses to do an independent laboratory project. Prerequisite: Psychology 205 or permission of instructor. Limited to 25 students. Not offered 1979–80.]

[308 Perceptual Learning Fall. 3 credits. Prerequisite: Psychology 201 or 305 or permission of instructor. Not offered 1979–80.]

309 Development of Perception and Attention Spring. 3 credits. Prerequisite: Psychology 201, 209, 214, 305, or permission of instructor.
M W F 10:10. A. Walker.
An ecological view of perceptual development: development of perception of objects, events, the spatial layout, pictures, and symbols. The level of the course is that of E. J. Gibson, *Perceptual Learning and Development*.

313 Perceptual and Cognitive Processes Spring. 3 credits. Prerequisite: Psychology 205 or 214, or permission of instructor.
T R 10:10–11:40. L. Cooper.
Survey of research and theory in the area of perceptual and higher mental processes. Emphasis is on the human as an information processing system. Topics include visual information processing, pattern recognition, cognition, memory, and artificial intelligence.

[316 Auditory Perception Spring. 3 or 4 credits. 4 credit option involves a laboratory project or paper. Prerequisite: Psychology 205 or 209 or 214 or 215 (other psychology, linguistics, or biology courses may be used with permission of the instructor). Lec, T R 2:30–4:25; lab to be arranged. Not offered 1979–80.]

[322 Hormones and Behavior (also Biological Sciences 322) Spring. 3 credits. Prerequisites: one year of introductory biology plus a course in psychology or Biological Sciences 321. Limited to juniors and seniors, open to sophomores only by permission. Not offered 1979–80; next offered 1980–81.
T R 10:10–11:30. E. Adkins and R. Johnston.
The relationship between endocrine and neuroendocrine systems and the behavior of animals, including humans. Major emphasis is on sexual, parental, and aggressive behavior.]

324 Biopsychology Laboratory (also Biological Sciences 324) Spring. 3 credits. S-U grades optional. Limited to 25 juniors and seniors. Prerequisites: Psychology 201 or Biological Sciences 103–104 or Psychology 123 or Biological Sciences 321, and permission of instructor.
T R 1:25–4:25. Staff.
Experiments designed to provide research experience in animal behavior (including learning) and its neural and hormonal mechanisms. A variety of techniques, species, and behavior patterns are included.

325 Introductory Psychopathology Fall. 3 or 4 credits. The 3 credit option entails lectures, readings, and two exams. The 4 credit option requires an additional seminar-recitation meeting and a term paper. May be taken concurrently with Psychology 327 (for 3 credits in 325 and 2 credits in 327) with permission of instructor. Enrollment in Psychology 327 is limited. Prerequisite: a course in introductory psychology.
T R 12:20–2:15. R. Mack.
A survey of the various forms of psychopathology, child and adult, as they relate to the experiences of human growth and development. Presents a description of the major syndromes, investigations, theories of etiology, and approaches to treatment.

[326 Biopsychology of Animal Behavior Fall. 4 credits. Prerequisite: Psychology 123 or an introductory biology course. Offered alternate years. Not offered 1979–80; next offered 1980–81.
T R 2:30–4:25. R. Johnston.
Causation, development, and evolution of behavior in animals, primarily birds and mammals. Content areas include communication and social behavior, courtship and mating, aggression, parental behavior, imprinting, and socialization.]

327 Fieldwork in Psychopathology and the Helping Relationship Fall. 2 credits. Prerequisites: Psychology 325 or concurrent registration in 325 and permission of the instructor. Students do not enroll in advance for this course. Field placement assignments are made in Psychology 325 during the first two weeks of the semester. Students who have already taken Psych. 325 must contact the instructor during the first week of the semester. Enrollment is limited by the fieldwork placements available. Fee, $20.
Hours to be arranged. R. Mack.
An introductory fieldwork course for students currently enrolled in, or who have taken, Psychology 325. In addition to fieldwork, weekly supervisory/seminar meetings are held to discuss fieldwork issues and assigned readings.

328 Continuing Fieldwork in Psychopathology and the Helping Relationship Fall or spring. 2 credits each term. S-U grades only. Prerequisites: Psychology 325, 327, and permission of instructor. May not be taken more than twice. Students do not enroll in advance for this course. Students in Psychology 327 should inform their teaching assistant before the end of the semester of their desire to take Psychology 328. Students not currently in a field placement who want to take Psychology 328 should contact the instructor during the first week of the semester. Field placement assignments will be made during the first two weeks of the semester. Enrollment is limited by the fieldwork placements available. Fee, $20.
W 4–5; fieldwork and supervisory times to be arranged. R. Mack.
Designed to allow students who have begun fieldwork as part of Psychology 327 to continue their field placements, under supervision and for academic credit.

345 Afro-American Perspectives in Experimental Psychology (also Africana Studies 345) Spring. 3 or 4 credits. Prerequisite: introductory course in psychology or AS&RC 171. Offered in alternate years. Not offered 1980–81.
T R 2:30–4:25, plus one hour to be arranged if taken for 4 credits. A. W. Boykin.
Designed to examine crucial conceptual, empirical, and philosophical issues in experimental psychology that are directly relevant to Afro-Americans. Traditional approaches are probed and evaluated. Alternative thrusts from a black perspective are entertained and critiqued. Finally, the research process is evaluated as a potential tool for analysis and action in black communities.

350 Statistics and Research Design Fall. 4 credits. Prerequisite: a course in the behavioral sciences.
M W F 10:10. R. Darlington.
Devoted about equally to elementary applied statistics — both estimation and hypothesis testing — through two-way analysis of variance, and to general problems in the design and analysis of research projects.

361 Biochemistry and Human Behavior (also Nutritional Sciences 361) Fall. 3 credits. Prerequisites: Biological Sciences 101–102, Chemistry 103–104, Psychology 123, or permission of instructor.
M W F 11:15. D. Levitsky.
The course is intended to survey the scientific literature on the role of the brain and body biochemical changes as determinants of human behavior. The topics covered include action and effects of psychopharmacologic agents, biochemical determinants of mental retardation, biochemical theories of psychosis, effects of nutrition on behavior. A fundamental knowledge of human biology and chemistry is essential.

381 Person Perception and Impression Management (also Sociology 381) Spring. 4 credits. Limited to 25 students. Prerequisite: one course in social psychology.
T R 10:10–12:05. R. Kraut.
How do we learn about other people and influence what they learn about us? Person perception, attribution theory, impression management, and nonverbal communication are relevant topics. Seminar format.

383 Social Interaction (also Sociology 383) Spring. 4 credits. Prerequisite: a course in social psychology.
T R 1:25–2:40; lab, R 3–5. D. Hayes.
Analysis of social behavior episodes, their detailed structure, and changes. Materials include chronobiological, ethnomethodological, and nonverbal interactional considerations. Extensive practice in analysis of filmed and taped interactions required.

[384 Cross-Cultural Psychology (also Sociology 384) Spring. 4 credits. Prerequisites: a course in psychology and one in either sociology or in social or cultural anthropology, or consent of instructor. Not offered 1979–80; next offered 1980–81.
T R 12:20–2:15. W. Lambert.
We will critically consider the recent attempts to add to our information on human nature, experience, tradition, and behavior by contrasting and comparing people in different cultures, nations, and other groups. Emphasis is on recent findings, new methods of study and proposed applications.]

[385 Theories of Personality (also Sociology 385) Spring. 4 credits. Prerequisite: Psychology 101, 128, 214, or 275, or permission of instructor. M W F 12:20. W. Lambert. Not offered 1979–80.]

[386 Human Ethology (also Sociology 386) Fall. 4 credits. Prerequisites: a course in social psychology or animal social behavior or permission of instructor. Offered alternate years. R. Kraut and R. Johnston. Not offered 1979–80; next offered 1980–81.]

402 Current Research on Psychopathology Spring. 4 credits. Prerequisite: Psychology 325.
T R 12:50–2:15; section to be arranged.
R. Dworkin.
Current research and theory on the nature and etiology of schizophrenia, the affective disorders, and psychopathy. Approaches from various disciplines are considered. Minimal attention to psychotherapy.

[407 Selected Issues in Human Motivation Spring. 4 credits. Limited to 20 students. Prerequisites: Psychology 207 or 10 credits in psychology, and permission of instructor. Offered alternate years. A. W. Boykin. Not offered 1979–80; next offered 1980–81.]

411 Memory and Human Nature Fall. 4 credits. Limited to 20 students. Prerequisite: Psychology 201 or 214 or permission of instructor.
T R 2:30–4. U. Neisser.
Memory and other cognitive activities are considered in their natural and social context. Laboratory studies of memory are reviewed to the extent that they help us to understand ordinary mnemonic activities. Specific topics include memory for remote events and for one's childhood; for controversial and unacceptable material; for stories and conversations; for events; individual, developmental, and cultural differences in memory; effects of schooling and of specific skills.

416 Psychology of Language Fall. 4 credits. Prerequisite: Psychology 215 or permission of instructor.
M W F 9:05. F. Keil.
An advanced treatment of the nature of the human capacity for language. Topics include the nature of linguistic theory, syntax and semantics, aspects of language use (comprehension, memory and knowledge, thought and action, communication), and language acquisition.

422 Developmental Biopsychology Spring. 4 credits. Prerequisites: a course in introductory biology and a course in biopsychology or neurobiology (such as Psychology 123 or Biological Sciences 321).
M W F 9:05. B. Finlay.
Various aspects of the relation of the development of the nervous system to the unfolding of behavior are discussed. Topics include how growing neurons seek, recognize, and communicate with their targets; normal neuroembryology and the emergence of reflexive and complex behavior; how experience affects the developing brain; hormonal influences on brain structure and future behavior; and reorganizational capabilities of the young mammalian brain in response to trauma.

425 Brain and Behavior Fall. 3 or 4 credits. Prerequisites: a course in introductory biology and a course in biopsychology or neurobiology (such as Psychology 123 or Biological Sciences 321). 4-credit option includes a discussion section and requires an additional paper.
M W F 9:05. B. Finlay.
The relation between structure and function in the central nervous system is studied. Human neuropsychology and the contribution of work in animal nervous systems to the understanding of the human nervous system will be stressed. Some topics to be discussed include visual and somatosensory perception, the organization of motor activity, emotion and motivation, psychosurgery, and the neuropsychology of memory and language.

426 Seminar and Practicum in Psychopathology Spring. 4 credits. Limited to 16 junior or senior majors in psychology or the equivalent (such as HDFS). Prerequisites: Psychology 325; permission of instructor required in all cases.
T R 2:30–4:25; fieldwork to be arranged. R. Mack.
A seminar and fieldwork course for advanced students who have mastered the fundamental concepts of personality and psychopathology. An opportunity to explore in depth the various forms of psychopathology, etiology, and treatment, to discuss these in seminar, and to work with mental health professionals and those who seek their help.

436 Language Development (also HDFS 436) Fall. 3 or 4 credits. Limited to 30 students. Prerequisites: at least one course in cognitive psychology, cognitive development, or linguistics. A course in linguistics is strongly recommended.
T R 10:10–12:05. S. Shattuck-Hufnagel and B. Lust.
A survey of basic literature in language development. Major theoretical positions in the field are considered in the light of studies in first-language acquisition of phonology, syntax,and semantics from infancy onward. Attention is given to models of sentence processing in perception, production, and memory. The acquisition of communication systems in nonhuman species such as chimps and birds and the fundamental issue of relations between language and cognition are also discussed.

437 Human Behavior Genetics Fall. 4 credits. Limited to 25 students. Prerequisites: one year of college biology and two courses in psychology. A course in statistics is recommended. Offered alternate years. Next offered 1981–82.
T R 12:50–2:15. R. Dworkin.
Research examining genetic influences on personality, cognitive abilities, and mental disorders is considered. Some attention is also paid to biochemical and physiological factors that may be involved in the gene-behavior pathway. The interaction of genetic and environmental influences in human behavior is a continuing theme.

[440 Sleep and Dreaming Spring. 4 credits. Limited to 15 students. Prerequisites: advanced undergraduate or graduate standing and permission of instructor. J. Maas. Not offered 1979–80.]

443 The Politics of I.Q. Fall. 3 credits. Limited to 20 students. Prerequisite: elementary knowledge of theories and measurement of intelligence from prior courses or independent reading and permission of instructor.
T R 2:30–4. H. Levin.
The research on the ethnic, racial, and sexual bases of intelligence will be taken as the primary example with which to discuss political and social influences on the choice of research topics, the methods of investigation, and the interpretation of results. Some insights about these issues are available from historical changes in the research and by comparing the research in various countries, particularly the United States and Great Britain. The writings of Jensen, Herrnstein Schockley, Burt, Eysenck, Kamin, and their critics will be studied. Novels by Koestler and C. P. Snow will be read. Three brief papers will be required. The genetics of intelligence will not be covered.

[445 Research Excursions in Black Psychology Spring. 4 credits. Prerequisites: Psychology 345 or 20 credits of behavorial sciences or graduate standing, and permission of instructor. Offered alternate years. T R 2:30–4:25. A. W. Boykin. Not offered 1979–80; next offered 1980–81.]

[464 Motivation and Human Learning Spring. 4 credits. Prerequisites: Psychology 303 plus 307, or permission of instructor. Offered in alternate years. Not offered 1979–80.]

465 Mathematical Psychology Spring. 4 credits. Prerequisites: one year of college mathematics (finite mathematics and/or calculus), a course in probability or statistics, and a course in psychology. Offered even-numbered years.
T R 10:10–11:40. J. Cunningham.
Mathematical approaches to psychological theory are discussed. Possible topics include choice and decision, signal detectability, measurement theory, scaling, and stochastic models.

[467 Seminar: The Examined Self — A Psychohistorical View Spring. 4 credits. Prerequisites: 9 credits of psychology including Psychology 325 or equivalent, and permission of instructor before course enrollment. H. Feinstein. Not offered 1979–80.]

468 American Madness Spring. 4 credits. Prerequisite: Psychology 325 and permission of instructor.
T 12:20–2:15. H. Feinstein.
The seminar will be devoted to an analysis of insanity as a psychological and historical phenomenon. Selected writings by the mentally ill and their definers will be studied.

469 Psychotherapy: Its Nature and Influence Spring. 4 credits. Limited to senior psychology majors. Prerequisites: Psychology 325 or equivalent and permission of instructor before course enrollment.
W 7:30–10:30 p.m. R. Mack.
A seminar on the nature of psychotherapy. Issues related to therapeutic goals, differing views of the nature of man, ethical concerns, and research problems also are considered. Presentations by therapists of differing orientations and experiential and role-play exercises may be an integral part of the seminar experience.

470 (formerly 496 and 497) Undergraduate Research in Psychology Fall or spring. 1–4 credits. S-U grades optional. Written permission from the staff member who will supervise the work and assign the grade must be included with the course enrollment material. Students should enroll in the section listed for that staff member.
Hours to be arranged. Staff.
Practice in planning, conducting, and reporting independent laboratory, field, and/or library research.

471 Statistical Methods in Psychology I Fall. 4 credits. Prerequisite: Psychology 201 or equivalent, or permission of instructor.
M W F 11:15. J. Cunningham.
Basic probability, descriptive and inferential statistics. Topics include parametric and nonparametric tests of significance, Bayesian inference, correlation, and simple linear regression. The level of the course is that of W. L. Hays, *Statistics for Psychologists.*

472 Statistical Methods in Psychology II Spring, during the first 7 weeks only. 2 credits. Prerequisites: Psychology 471 or 350 or permission of instructor.
M W F 10:10. J. Cunningham.
Analysis of variance, experimental design, and related topics. The level of the course is that of G. Keppel, *Design and Analysis: A Researcher's Handbook.*

473 Statistical Methods in Psychology III Spring, during the last 7 weeks only. 2 credits. Prerequisite: Psychology 472 or permission of instructor.
M W F 10:10. R. Darlington.
General-linear-model approach to analysis of variance, analysis of covariance, and multiple regression, at the level of *Multiple Regression in Behavioral Research* by F. Kerlinger and E. Pedhazur.

475 Analysis of Nonexperimental Data Fall, during the first 7 weeks only. 2 credits. Prerequisite: Psychology 473 or permission of instructor. Offered odd numbered years. Not offered 1980–81.
T R 10:10–12:05. R. Darlington.
Correlational methods, factor analysis, canonical analysis, canonical reduction analysis, discriminant analysis, panel analysis, multiple comparisons, robust regression.

[476 Representation of Structure in Data Spring. 3 credits. Prerequisite: one year of college mathematics (finite mathematics and/or calculus) and a course in the social sciences. Offered odd-numbered years. Not offered 1979–80.
T R 10:10–11:40. J. Cunningham.
Spatial and discrete representations of preferences and psychological distances are discussed. Topics include unidimensional and multidimentional scaling, unfolding, individual differences scaling, hierarchical clustering, and graph-theoretic analysis.]

[478 Psychometric Theory Fall, during the first 7 weeks only. 2 credits. Prerequisite: Psychology 473 or permission of instructor. Offered even-numbered years.
T R 10:10–12:05. R. Darlington.
Statistical methods relevant to the use, construction, and evaluation of psychological tests.]

480 (formerly 380) Attitudes and Social Cognitions (also Sociology 480) Spring. 4 credits. Prerequisites: Psychology or Sociology 280, or two courses in psychology or sociology, or graduate standing.
M W F 1:25–2:15. L. Meltzer.
An intensive analysis of theory, research, measurement, and practical implications concerning beliefs, attitudes, values, opinions, stereotypes, self-concepts, intentions, and other social cognitions. The main emphasis is on comparison of different theoretical concepts such as scripts, frames, dissonance, attributions, and balance. Areas of application include political behavior, racism and prejudice, sex-role conceptions, persuasion, and population control.

481 Advanced Social Psychology (also Sociology 481) Fall. 4 credits. Limited to 30 students. Prerequisite: a course in social psychology or permission of instructor.
T R 10:10–11:25. D. Regan.
Selected topics in social psychology are examined in depth, with heavy emphasis on experimental research. Readings are usually original research reports. Topics discussed may include: social comparison theory, social and cognitive determinants of the emotions, cognitive dissonance, attribution processes, interpersonal attraction, and research methods in social psychology.

482 Death and Dying Spring. 4 credtis. Limited to 40 juniors and seniors. Prerequisites: 6 credits in sociology or psychology.
Sec I, T 2:30–4:25; sec II, R 2:30–4:25. W. Collins.
Issues of death and dying in modern American society are explored, from the perspectives of psychology, sociology, and the health related professions. Possible inadequacies in current practice are examined and alternatives discussed.

[483 Socialization and Maturity (also Sociology 483) Fall. 4 credits. Limited to upperclass and graduate students or those who receive permission of instructor. Prerequisite: some work in psychology, sociology, and/or anthropology; some background in statistics is assumed. Not offered 1979–80; next offered 1980–81.
T R 12:20–2:15. W. Lambert.
Representative theories of research on socialization at different ages are analyzed, focusing particularly on the underlying processes. The newer topic of personal and sociocultural maturity is also analyzed and its relation to socialization processes is evaluated in terms of recent evidence.]

[484 (formerly 382) Individual Differences and Psychological Assessment (also Sociology 484) Spring. 4 credits. Limited to upperclass students. Prerequisites: an introductory course in psychology or sociology and a course in statistics. Not offered 1979–80.
M W F 2:30. D. Bem, R. Darlington.
An analysis of current methods and models for assessing individual and group differences. Particular emphasis is on the measurement of personality. Quantitative models for predicting behavior from assessment instruments are examined, and current controversial issues in assessment are discussed.]

[486 Interpersonal and Social Stress and Coping (also Sociology 486) Spring. 4 credits. Limited to upperclass students. Prerequisites: background in psychology and introductory statistics, or consent of instructor. Not offered 1979–80; next offered 1980–81.
Hours to be arranged. W. Lambert.
A critical review of work on interpersonal, situational, and sociocultural sources of stress; the major psychophysiological concomitants of such stress; and the resultant attempts to cope.]

488 Research Practicum in Socialization (also Sociology 488) Spring. 4 credits. Prerequisites: two courses in social psychology or human development and one course in statistics, or permission of instructor.
R 2:30–4:25. U. Bronfenbrenner.
Supervised participation in field and experimental studies bearing on the impact of family support systems on socialization practices and outcomes. The work concentrates on the American phase of a project being conducted cooperatively in five industrialized societies.

489 Seminar: Selected Topics in Social Psychology (also Sociology 489) Fall. 4 credits. Limited to seniors. Prerequisites: one course in psychology and one course in social psychology or sociology and permission of instructor.
T 2:30–4:25. S. C. Jones.
The specific topics of discussion vary, but the general emphasis is on a critical examination of the study of individuals in society.

490 Historical Roots of Modern Psychology (also Education 490; Human Development and Family Studies 490; Industrial and Labor Relations 470) Spring. 4 credits. Intended for sophomores, graduate students, majors, and nonmajors. Prerequisites: At least three courses in behavioral science, or consent of the instructor.
M W F 12:20–1:10. Staff.
A survey of the major historical antecendents of contemporary psychology, including the philosophical tradition (from Aristotle through the Enlightenment), the medical-therapeutic tradition, and the rise of modern science and experimental psychology. Scholars from across the University give presentations in their own specialties. Students do concentrated work in their own area of interest.

491 Principles of Neurobiology, Laboratory (also Biological Sciences 491) Fall. 4 credits. Limited to 36 students. Prerequisites: Biological Sciences 496 or Psychology and Biological Sciences 495 or written permission of instructors.
M W or T R 12:20–4:25. B. Land and staff.
Laboratory practice with neurobiological preparations and experiments, designed to teach the techniqes, experimental designs, and research strategies used to study biophysical and biochemical properties of excitable membranes, sensory receptors, and the central nervous system transformations of afferent activity as well as the characteristic composition and metabolism of neural tissue. Theoretical content at the level of Junge's *Nerve and Muscle Excitation*.

494 Junior Honors Spring. 4 credits. Prerequisite: admission to the department honors program.
Staff.

498 Senior Honors Dissertation Fall. 4 credits. Prerequisite: admission to the departmental honors program.
Staff.

499 Senior Honors Dissertation Spring. 4 credits. Prerequisite: admission to the departmental honors program.
Staff.

Advanced Courses and Seminars

Advanced seminars are primarily for graduate students, but with the permission of the instructor, they may be taken by qualified undergraduates. The selection of seminars to be offered each term is determined by the needs of the students.

A supplement describing these advanced seminars is available at the beginning of each semester and can be obtained from the department office. Except where indicated, the following courses may be offered either term, and carry 4 credits unless otherwise indicated.

502 Practicum in Article Writing (May not be taken by undergraduates for credit.)

510–511 Perception

512–514 Visual Perception

513 Learning

515 Motivation

517 Language and Thinking

518 Psycholinguistics

519–520 Cognition

521 Psychobiology

522 Topics in Perception and Cognition

523 Physiological Psychology

525 Mathematical Psychology

531 History of Psychology

535 Animal Behavior

541 Statistical Methods

543 Psychological Tests

544 Topics in Psychopathology and Personality

545 Methods in Social Psychology

547 Methods of Child Study

561 Human Development and Behavior

580 Experimental Social Psychology (also Sociology 580)

582 Sociocultural Stress, Personality, and Somatic Pathology (also Sociology 582)

583–584 Proseminar in Social Psychology (also Sociology 583–584)

585 Social Structure and Personality (also Sociology 585)

586 Interpersonal Interaction (also Sociology 586)

587 Personality (also Sociology 587)

588 Social Change, Personality, and Modernization (also Sociology 588)

591 Educational Psychology

595 Teaching of Psychology

596 Improvement of College Teaching

599 How to Generate Stimuli and Control Experiments with a Small Computer Fall.
Prerequisite for undergraduates: written permission of instructor before course enrollment.
T 1:25–3:35. W. Hemsath.
Individuals who expect to use the EPIC computer facility, or other small computer facilities, should register for this course.

600 General Research Seminar 0 credits.

611 Practicum in Research

621 Thesis Research

682 Social Psychology (also Sociology 682)

683 Seminar in Interaction (also Sociology 683)

684 Seminar: Self and Identity (also Sociology 684)

685 Seminar in Sex Differences, Sex Roles, and Sexuality (also Sociology 685) Fall. Limited to 15 students.
R 2:30–4:25. S. Bem.

690 Nutrition and Behavior (also Nutritional Sciences 690)

691 Independent Research

692 Independent Study

[693 Sensory Function (also Biological Sciences 693) Fall. 3 credits. Offered even-numbered years. Hours to be arranged. B. Halpern, H. Howland, R. Capranica, B. Finlay. Next offered 1980–81.]

Summer Session Courses

The following courses are also frequently offered in the summer session though not necessarily by the same instructor as during the academic year. Information regarding these courses and additional summer session offerings in psychology is available from the department before the end of the fall semester.

101 Introduction to Psychology: The Frontiers of Psychological Inquiry

124 Introduction to Psychology: The Cognitive Approach

128 Introduction to Psychology: Personality and Social Behavior

209 Developmental Psychology

215 Introduction to Linguistics and Psychology

281 Interpersonal Relations and Small Groups (also Sociology 281)

286 Nonverbal Behavior and Communication (also Sociology 286)

325 Introductory Psychopathology

381 Social Psychology

385 Theories of Personality

469 Psychotherapy: Its Nature and Influence

Sociology

101 Introduction to Sociology Fall. 3 credits.
M W 12:20, plus one hour to be arranged. R. Alba.
An introduction to basic aspects of social structure including culture, social roles, the nature of groups, and inequalities of wealth, honor, and power. Essential methods of social research are also covered, along with an overview of current research findings about American society.

107 Introduction to Sociology: Conflict and Cooperation Spring. 3 credits. Limited to freshmen and sophomores.
M W F 10:10. R. M. Williams, Jr.
Are human societies fundamentally cooperative or conflictful? In what ways? Why? And with what consequences? Examination of contemporary sociological analyses and the views of such precursors as Hobbes, Marx, Kropotkin, Sumner, and Simmel. Data from current research is reviewed.

[141 Introduction to Sociology: Applications to Policy Fall. 3 credits. M W F 10:10. S. Caldwell. Not offered 1979–80.]

172 Introduction to Sociology: Urban Society Spring. 3 credits.
M W F 11:15. B. Bowser.
The sociological analysis of urbanism and urbanization. Alternative explanations of industrial urban development are assessed with a specific focus on historical and contemporary urban community studies that serve as models of social structure and group (class, ethnic, race) divisions. Trends in the United States and in other countries are also examined, using such information as a basis for considering contemporary problems and the urban future.

205 Women and the Media (also Women's Studies 205) Spring. 3 credits.
M W F 10:10. C. Cohen.
See Women's Studies 205 for course description.

207 Ideology and Social Concerns Fall. 3 credits (4-credit option available).
M W F 11:15. R. M. Williams, Jr.
Analysis of social and cultural bases of public policies at national, state, and local levels. Relates demographic, social, and cultural factors to the changing recognition of problems and to shifting modes of collective action, such as direct mobilization, legislation, administration, and adjudication. Representative recent public issues examined include affirmative action, civil rights, environmental regulation, military affairs, social security and income maintenance, health, medicine, bioethics, centralization, and local control. Deals with the two basic dilemmas of social choice: the problem of the commons and the problem of collective action.

230 Population Problems Spring. 3 credits (4-credit option available).
T R 9:05 and hour to be arranged. J. M. Stycos.
The practical and scientific significance of population growth and composition. Fertility, migration, and mortality in relation to social and cultural factors and in relation to questions of population policy. National and international data receive equal emphasis.

238 American Women and the Female Professions, 1815–Present (also Women's Studies 238) Fall. 3 credits.
T R 2:30–4. J. Brumberg.
See Women's Studies 238 for course description.

240 Personality and Social Change. Spring. 3 credits (4-credit option available).
T R 1:25—2:40. B. C. Rosen.
An analysis of psychological and sociological theories of social change. Case studies of actual social change are taken from newly industrializing as well as technologically advanced societies.

243 Family (also HDFS 253) Fall. 3 credits (4-credit option available).
T R 10:10 and hour to be arranged. B. C. Rosen.
The structure and function of the family both in the West and cross-culturally. Specific areas examined include sex roles, socialization, mate selection, sex and sexual controls, internal familial processes, disorganization, and social change.

245 Inequality in America Spring. 3 credits (4-credit option available).
M W F 1:25. Staff.
Recent trends in the unequal distribution of income, occupation, and education in the United States; inheritance of riches and of poverty; importance of ethnic membership; sex differences; deliberate attempts by government policy to alter these trends; evaluation of the "war on poverty."

252 Public Opinion Spring. 4 credits.
T R 10:10 and hour to be arranged. R. K. Goldsen.
Analysis of television as a social institution—how it works and how it saturates the cultural habitat within which public opinion forms.

255 Sociology of Science and Technology Spring. 3 credits (4-credit option available).
T R 2:30 and hour to be arranged. P. Allison.
How the growth of knowledge is facilitated and impeded by the social behavior of scientists, including competition, teamwork, communication, secrecy, conformity, and deviance; causes and consequences of scientific revolutions; factors affecting scientific careers; history of science as a social institution.

264 Race and Ethnicity Fall. 3 credits (4-credit option available).
M W F 10:10. R. Alba.
An examination of the importance of race and ethnicity in contemporary American society. Some review of historical background through such topics as the Old World roots of ethnic cultures, migration, slavery, and American responses to immigration. Of fundamental concern is the tension between assimilation and the persistance of racial and ethnic identities, traced through patterns of mobility, intermarriage, and organized crime. Blacks, Jews, Italians, and other ethnic groups are considered.

265 Hispanic Americans Spring. 3 credits (4-credit option available).
T R 10:10–11:25. H. Velez.
Analysis of the present-day Hispanic experience in the United States. An examination of sociohistorical backgrounds as well as the economic, psychological, and political factors that converge to shape and influence a Hispanic group-identity in the United States. Perspectives are developed for understanding the diverse Hispanic migrations, their plight of Hispanics in urban and rural areas, and the unique problems faced by the different Hispanic groups. Groups studied include Dominicans, Chicanos, Cubans, and Puerto Ricans.

277 Psychology of Sex Roles (also Psychology 277 and Women's Studies 277) Spring. 3 credits (4-credit option available). Prerequisite: any introductory course in psychology.
T R 10:10–11:30. S. Bem.
This course addresses the question of why and how adult women and men come to differ in their overall life styles, work and family roles, personality patterns, cognitive abilities, etc. This broad question is examined from five perspectives: (a) the psychoanalytic perspective, (b) the biological perspective, (c) the historical/cultural evolutionary perspective, (d) the child development perspective, and (e) the social psychological/contemporaneous perspective. Each of these perspectives also bears on a number of more specialized phenomena relating to the psychology of sex roles, including psychological androgyny, women's conflict over achievement, the male sex role, equalitarian marriage relationships, female sexuality, homosexuality, and transsexualism.

280 Social Influence Processes: Attitude and Behavior Change (also Psychology 280) Spring. 3 credits.
T R 10:10–11:25. D. Regan.
Intended to provide an extensive review of the literature of social influence processes. Beginning with the effects of the mere presence of others on behavior, we will discuss theory and empirical research related to conformity, compliance, group decision making, and attitude change. The relationship between attitudes and behavior will be examined in detail, and application will be made to naturally occurring social influence situations.

[281 Interpersonal Relations and Group Processes (also Psychology 281) Fall. 4 credits. L. Meltzer. Not offered 1979–80.]

[289 Conformity and Deviance (also Psychology 289) Spring. 4 credits. Prerequisite: one course in sociology or psychology. T R 2:30–4, rec to be arranged. R. Kraut. Not offered 1979–80.]

307 Collective Behavior and Social Movements (also HDFS 307) Fall. 3 credits (4-credit option available).
T R 2:30–4. G. Elder.
An inquiry into social behavior that breaks with institutionalized or conventional forms, such as acting crowds, riots, social movements, and revolution. Analysis of antecedent conditions, emergent forms, processes, and consequences. Historical and contemporary studies are covered.

321 Field and Laboratory Techniques in Sociology Fall. 4 credits. Prerequisite: a course in sociology.
T R 10:10–11:25; lab, R 3–5. D. Hayes.
Research design and the operational side of laboratory methodology, with a series of field and laboratory projects. Students carry out several studies from planning to analysis stages.

325 Evaluating Statistical Evidence Spring. 4 credits.
M W F 10:10. R. McGinnis.
A first course in the use of statistical evidence in the social sciences. Theory is supplemented with numerous applications. Includes an introduction to multivariate causal analysis.

348 Sociology of Law Fall. 4 credits.
M W 1:25 and hour to be arranged. J. Jacobs.
The subject matter and course materials vary. In 1979 the course focuses on civil rights and civil liberties in the context of institutions of social control. The main theme is that the extension of constitutional rights to such "marginal" citizens as prisoners, mental patients, students, and soldiers has created something of a crisis in authority for the institutions with which these groups are associated. The basis of institutional authority and order is explored in light of the drive to expand personal rights. Readings consist of a casebook of legal decisions and excerpts from legal and sociological studies.

[352 Prisons and Other Institutions of Coercion Spring. 4 credits. Prerequisite: a course in the social sciences. J. Jacobs. Not offered 1979–80.]

355 Social and Political Studies of Science (also Science, Technology, and Society 355) Spring. 3 credits.
W 2:30–4:30. D. Nelkin, S. DelSesto.
A view of science, less as an autonomous activity than as a social and political institution. The focus is on its relationship to government, the media, religion, and education. Drawing from recent controversies over science, such questions as ethics and social responsibility in science, struggles to maintain internal control over research and over the teaching of science, and the concept of limits to inquiry are discussed.

[356 Contemporary Sociology for Scientists and Engineers Spring. 4 credits. Prerequisite: elementary finite mathematics or consent of the instructor. R. McGinnis. Not offered 1979–80.]

357 Medical Sociology Fall. 4 credits. Prerequisite: a course in the social sciences.
M W F 11:15. B. Edmonston.
Health, illness, death, and the health institutions from a sociological perspective. Factors affecting health care; organization of the medical professions; health and illness behavior; social epidemiology; and key issues in policies affecting the administration and delivery of medical care in the United States.

[367 After the Revolution: Mexico and Cuba Fall. 4 credits. Prerequisite: two courses in the social sciences. J. Kahl. Not offered 1979–80.]

368 Contemporary Brazil (also History 348) Spring. 4 credits. Prerequisites: two courses in the social sciences.
M W F 1:25. J. Kahl, T. Holloway.
A study of the style of development in economy, polity, and society followed by contemporary Brazil, and an analysis of the contradictions that led to the military coup of 1964 and its aftermath. Some comparisons with other Latin American countries are made. Assigned readings are in English.

378 Economics, Population, and Development (also Economics 378) Fall. 4 credits.
M W F 10:10 R. Avery.
An introduction to population from an economic perspective. Particular attention is paid to economic views of population size, fertility, mortality, and migration, and to the impact of population change on development, modernization, and economic growth.

381 Person Perception and Impression Management (also Psychology 381) Spring. 4 credits. Limited to 25 students. Prerequisite: one course in social psychology.
T R 10:10–12:05. R. Kraut.
How do we learn about other people and influence what they learn about us? Person perception, attribution theory, impression management, and nonverbal communication are relevant topics. Seminar format.

383 Social Interaction (also Psychology 383) Spring. 4 credits. Prerequisite: a course in social psychology.
T R 1:25–2:40; lab, R 3–5. D. Hayes.
Analysis of social behavior episodes, their detailed structure, and changes. Materials include chronobiological, ethnomethodological and nonverbal interactional considerations. Extensive practise in analysis of filmed and taped interactions required.

[384 Cross-Cultural Psychology (also Psychology 384) Spring. 4 credits. Prerequisites: a course in psychology and one in either sociolgy or in social or cultural anthropology, or consent of instructor. Not offered 1979–80; next offered 1980–81.
W. Lambert.
See Psychology 384 for course description.]

[385 Theories of Personality (also Psychology 385) Spring. 4 credits. Prerequisite: Psychology 101, 128, 275, or permission of instructor. M W F 12:20. W. Lambert. Not offered 1979–80.]

[386 Human Ethology (also Psychology 386) Fall. 4 credits. Prerequisite: a course in social psychology or in animal social behavior, or permission of instructor. T R 2:30–4. R. Kraut, R. Johnston. Offered alternate years. Not offered 1979–80.]

404 Advanced Principles of Sociology (also Rural Sociology 404) Spring. 4 credits.
Seminar, T 2:30–4:25 J. Kahl.
An advanced undergraduate seminar for senior majors in sociology and rural sociology. The course will focus on: (1) the central concepts of the sociological tradition; (2) major classical theorists (Marx, Weber, Durkheim, Tocqueville) and contemporary counterparts; (3) application of the classical ideas in contemporary research.

420 Mathematics for Sociologists Fall. 1–4 credits.
M W 2:25–4:30; lab, F 2:25–4:30. R. McGinnis.
Elementary matrix algebra; probability theory, and calculus.

424 Multivariate Analysis with Quantitative Data Spring. 4 credits. Prerequisite: a college course in statistics (such as Sociology 325) and matrix algebra.
T R 10:10–11:40. P. Allison.
The general linear regression model with interval scaled variables. Detecting violations of assumptions of the model in real data and providing remedies. Both single and multiple equation models (including path analysis).

425 Categorical Data Analysis Fall. 4 credits. Prerequisite: Sociology 424 or equivalent.
T R 10:10–11:45. P. Allison.
Techniques for including categorical (discrete) variables in multivariate models. Log-linear analysis of multidimensional contingency tables; dummy variable regression; logit, probit, and regression models with categorical dependent variables. Emphasis on applications.

426 Policy Research: Uses, Methods, Case Studies (also Rural Sociology 426) Spring. 3 credits. Prerequisite: a course in multivariate statistics.
T R, hours to be arranged. Staff.

[430 Social Demography Spring. 4 credits. Prerequisite: junior standing or permission of instructor. B. Edmonston. Not offered 1979–80.]

431 Techniques of Demographic Analysis Fall. 4 credits. Prerequisite: Sociology 230 or 330.
M W 2:30 and hour to be arranged. B. Edmonston.
A description of the nature of demographic data and the specific techniques used in their analysis. Mortality, fertility, migration, and population projection are covered, as well as applications of demographic techniques to other types of data.

433 Human Fertility in Developed Nations Spring. 4 credits. Prerequisite: Sociology 230 or 330 or permission of instructor.
T 3:55–5:30. R. Avery.
An analysis of the social causation of fertility in areas where fertility is fairly low. The major studies of differential fertility, both in the United States and in other areas where contraception is widely used, are reviewed. The emphasis is on reasons for differentials in fertility between groups and the reasons for changes in fertility patterns.

435 Mortality and Morbidity Spring. 4 credits. Prerequisite: Sociology 230, 430, 431, or permission of instructor.
W 2:30–5. B. Edmonston.
A study of causes and distribution of death and disease in human populations. Reporting and measurement of mortality and morbidity are considered within the context of major disease patterns. A demographic and epidemiological perspective is used to analyse the cause, treatment, and prevention, of illness. Emphasis is on mortality and disease in developing countries.

[438 Human Migration and Residential Mobility Spring. 4 credits. Prerequisite: Sociology 230 or 330, or permission of instructor. Offered alternate years. T 1:25–3:20. Staff. Not offered 1979–80.]

441 Structure and Functioning of American Society Fall. 4 credits. Prerequisite: a course in sociology or permission of instructor.
M W F 9:05. R. M. Williams, Jr.
Analysis of a total societal system. Critical study of the institutions of kinship, stratification, the economy, the polity, education, and religion. Special attention is given to values and their interrelations, and to deviance and evasion. A survey of the groups and associations making up a pluralistic nation is included.

445 Law and Social Theory Spring. 4 credits. Prerequisite: Sociology 348 or permission of instructor or graduate standing.
T 3:35–5:30. J. Jacobs.
Major intellectual traditions contributing to what is loosely called the sociology of law. Attention is paid to the classical theorists — Weber, Durkheim, and Marx — as well as to contemporary American and European legal and sociological scholars. The underlying theme is the relationship of law to social order.

462 Society and Consciousness Spring. 4 credits. Limited to 15 students. Prerequisite: permission of instructor.
Hours to be arranged. R. Goldsen.
An examination of the role of the social system in the formation of human consciousness.

480 Attitudes and Social Cognitions (also Psychology 480) Spring. 4 credits. Prerequisite: Psychology or Sociology 280, or two courses in psychology or sociology, or graduate standing.
M W F 1:25–2:15. L. Meltzer.
An intensive analysis of theory, research, measurement, and practical implications concerning beliefs, attitudes, values, opinions, stereotypes, self-concepts, intentions, and other social cognitions. The main emphasis is on comparison of different theoretical concepts such as scripts, frames, dissonance, attributions, and balance. Areas of application include political behavior, racism and prejudice, sex-role conceptions, persuasion, and population control.

481 Advanced Social Psychology (also Psychology 481) Fall. 4 credits. Limited to 30 students. Prerequisite: a course in social psychology or permission of instructor.
T R 10:10–11:25. D. Regan.
Selected topics in social psychology are examined in depth, with heavy emphasis on experimental research. Readings are usually original research reports. Topics discussed may include: social comparison theory, social and cognitive determinants of the emotions, cognitive dissonance, attribution processes, interpersonal attraction, and research methods in social psychology.

[483 Socialization and Maturity (also Psychology 483) Fall. 4 credits. Limited to upperclass and graduate students and those who receive permission of instructor. Prerequisite: some work in psychology, sociology or anthropology; some background in statistics is assumed. Not offered 1979–80; next offered 1980–81.
W. Lambert
See Psychology 483 for course description.]

[484 Individual Differences and Psychological Assessment (also Psychology 484) Spring. 4 credits. Prerequisites: introductory course in psychology or sociology and a course in statistics and junior standing. Not offered 1979–80.
T R 2:30–4. D. Bem, R. Darlington.
An analysis of current methods and models for assessing individual and group differences. Particular emphasis is on the measurement of personality. Quantitative models for predicting behavior from assessment instruments are examined, and current controversial issues in assessment are discussed.]

[486 Interpersonal and Social Stress and Coping (also Psychology 486) Spring. 4 credits. Limited to upperclass students. Prerequisite: background in psychology and introductory statistics, or consent of instuctor. Not offered 1979–80; next offered 1980–81.
W. Lambert.
See Psychology 486 for course description.]

488 Research Practicum in Socialization (also Psychology 488) Spring. 4 credits. Prerequisites: two courses in social psychology or human development and one course in statistics, or permission of instructor.
R 2:30–4:25. U. Bronfenbrenner.
Supervised participation in field and experimental studies bearing on the impact of family support systems on socialization practices and outcomes. The work concentrates on the American phase of a project being conducted cooperatively in five industrialized societies.

489 Seminar: Selected Topics in Social Psychology (also Psychology 489) Fall. 4 credits. Limited to seniors. Prerequisites: one course in psychology and one course in sociology or social psychology and permission of instructor.
T 2:30–4:30. S. Jones.

491 Selected Topics in Sociology Fall or spring. 2 credits. Prerequisite: permission of instructor.
Hours to be arranged.

492 Selected Topics in Sociology Fall or spring. 4 credits. Prerequisite: permission of instructor.
Hours to be arranged.

495 Honors Research: Senior Year Fall or spring. 4 credits. Limited to sociology majors. Prerequisite: permission of instructor.
Hours to be arranged. D. Hayes and staff.

496 Honors Thesis: Senior Year Fall or spring. 4 credits. Prerequisite: Sociology 495.
Hours to be arranged. D. Hayes and staff.

497 Social Relations Seminar (also Anthropology 495) Spring. 4 credits. Limited to seniors majoring in social relations.
Staff.

Graduate Seminars

These seminars are primarily for graduate students but may be taken by qualified advanced undergraduates who have permission of the instructor. Which seminars are to be offered any term is determined in part by the interests of the students, but it is unlikely that any seminar will be offered more frequently than every other year. Lists and descriptions of seminars are available from the department well in advance of each semester. The list below indicates seminars that are likely to be offered in 1979–80, but others may be added. Students should check with the department before each term. All seminars are offered for 4 credits unless otherwise specified.

531 Population Policy (also Biology and Society 403) Fall. 4 credits. Prerequisite: graduate standing or permission of instructor.
W 3:35–5:30. J. M. Stycos.
The ways in which societies try to affect demographic trends. Special focus is on government policies and programs to influence fertility.

541 Social Organization and Change Spring. 4 credits. Prerequisite: graduate standing or permission of instructor.
M W 1:25–3:20. R. M. Williams, Jr.
Systematic review of theory and research, with emphasis on substantive knowledge and testable hypotheses. Subjects included are social processes, social structures, cultural content, and social and cultural change. Attention is given to the nature and size of the social system (small groups, communities, large organizations, societies) and also to both macro- and micro-social processes and properties (integration, authority, conformity, and deviance).

585 Social Structure and Personality (also Psychology 585) Fall.
B. Rosen.

[586 Interpersonal Interaction (also Psychology 586) Fall. R. Krant. Not offered 1979–80.]

632 Research Seminar in Population Spring.
R. Avery and B. Edmonston.

645 Social Networks Spring. 4 credits.
To be arranged. R. Alba.
An examination of the patterns of linkage between people, organizations, and institutions as constituting the foundation of social structure. These patterns and their implications are explored in areas such as the sociology of science and the study of power and influence. Theoretical and methodological issues receive equal attention.

683 Social Interaction (also Psychology 683) Spring.
D. Hayes, R. Kraut, L. Meltzer.

685 Seminar in Sex Differences, Sex Roles, and Sexuality (also Psychology 685 and Women's Studies 685) Fall. Limited to 15 students.
R 2:30–4:25. S. Bem.

691–692 Directed Research Fall or spring. Up to 4 credits, to be arranged. Prerequisite: permission of instructor.

695 Thesis Research Fall or spring. Up to 6 credits, to be arranged. Prerequisite: permission of thesis director.

Theatre Arts

Theatre Laboratory

Theatre Arts 151 and 152 are offered either term. Theatre Arts 155 is offered fall term; 156 spring term. These courses may be repeated for credit. Acting, directing, and managerial and technical responsibilities in production of theatre and dance are under the supervision of the department staff. Participation is also open to students without credit.

Theatre Arts 151, 152, 155, and 156 may be added or dropped without penalty at any time during the semester.

151 Technical Theatre Fall or spring. 1 or 2 credits. S-U grades only.
Orientation meeting in Willard Straight Theatre at 7:30 p.m. on the first day of instruction. K. Golden.
Practice in construction, painting, and lighting for University Theatre productions under the supervision of the set designer or the technical director.

152 Technical Theatre Fall or spring. 1 or 2 credits. S-U grades only.
Orientation meeting in the Costume Shop, 201 Lincoln Hall, at 7:30 p.m. on first day of instruction. P. Alexander.
Practice in costuming and make up for University Theatre productions under the supervision of the costume designer.

155 Rehearsal and Performance Fall. 1 to 3 credits; no more than 3 credits each semester. S-U grades only. Limited to students who are assigned roles after try-outs at the department's scheduled auditions. The number of credits granted is based upon the complexity of the role. Students should add this course only after they have been assigned roles. The study, development and performance of a role in departmental productions.
M. Hillyer.

156 Rehearsal and Performance Spring. 1 to 3 credits; no more than 3 credits each semester. S-U grades only.
M. Hillyer.
See course description for Theatre Arts 155.

Acting

280 Introduction to Acting Fall or spring. 3 credits. Each section limited to 16 students. Prerequisite: registration only through department roster in 104 Lincoln Hall.
Sec 1, 2, 3, and 4, T R 12:20–2:15; sec 5, M W 10:10–12; sec 6, M W 2:30–4:25. Staff.
Introduction to the problems and basic technique of the actor. Practice in creative exercises, improvisation, psychological sets, and physical images.

380 Intermediate Acting Fall or spring. 3 credits. Each section limited to 16 students. Prerequisites: Theatre Arts 280 and registration only through department roster in 104 Lincoln Hall. May be repeated for credit with permission of instructor.
Sec 1, M W 2:30–4:30; sec 2, M W 12:20–2:15. J. Zych.
A continuation of Theatre Arts 280, with emphasis on methodology and scene study.

381 Advanced Acting Fall or spring. 3 credits. Prerequisites: Theatre Arts 380 and permission of instructor. May be repeated for credit with permission of instructor.
Fall: T R 2:30–4:30, staff; spring: T R 2:30–4:30, S. Cole.
Practical emphasis upon integration of conception, preparation of role, and techniques of presentation.

780 Graduate Acting Fall or spring. 2 credits. May be repeated for credit.
Sec 1, M W 2:30–4:30, S. Cole; sec 2, T R 2:30–4:30, J. A. Zych.
Study and practice of fundamental and advanced techniques and methodology.

American Mime

575 American Mime Orientation I Fall. 2 credits. Prerequisite: Theatre Arts 280. Students enrolled in American Mime must contact the Department of Theatre Arts about supplies one month before the beginning of classes.
F 2–4. P. Curtis and other teachers from the American Mime Theatre.
American Mime is a unique performing art created by a particular balance of playwriting, acting, moving, pantomime, and theatrical equipment. It is a complete theater medium defined by its own aesthetic laws, terminology, techniques, script material, and teaching methods, in which nonspeaking actors, in characterization, perform the symbolic activities of American Mime plays through movement that is both telling and beautiful.

576 American Mime Orientation II Spring. 2 credits. Prerequisite: Theatre Arts 575 or permission of instructor.
F 2–4. P. Curtis and other teachers from the American Mime Theatre.
A continuation of Theatre Arts 575.

Voice and Speech

682 Voice and Speech for Performance Fall. 2 credits. Limited to 12 students. Primarily for department majors. Prerequisite: permission of department secretary.
M W 2:30–4:25. Staff.
Emphasis is on voice production: breathing and relaxation, articulation, and understanding the special demands made on a voice during performance.

683 Voice and Speech for Performance Spring. 2 credits. Limited to 12 students. Primarily for department majors. Prerequisites: Theatre Arts 682 and permission of department secretary.
M W 2:30–4:25. Staff.
Continued work on the task of making sound meaningful; emphasis is on range, balance, and tone.

782 Advanced Voice and Speech for Performance Fall. 2 credits.
M T W R F 10:45–1:00. Staff.
Emphasis is on achieving maximum flexibility and freedom of the voice. Areas stressed are breathing, vowels and consonants, and acting problems related to the voice.

783 Advanced Voice and Speech for Performance Spring. 2 credits. Prerequisite: Theatre Arts 782.
M–F 10:45–1. Staff.
A continuation of Theatre Arts 782, but with a focus on pitch, resonance, tone, tempo, and style.

Dance

Enrollment in all dance courses takes place at Teagle Hall. Schedules for technique classes are available in the Dance Office, Helen Newman Hall.

Students may receive credit for performance in student/faculty concerts. Admission is with permission of the instructor. Hours are arranged through the Dance Office, Helen Newman Hall. One academic credit (S-U grades only) may be earned for this (see Theatre Arts 155–156, Rehearsal and Performance).

200 Dance and Movement for the Theatre Fall. 3 credits. Concurrent enrollment in a technique class at the appropriate level is required.
J. Desmond and P. Lawler.
Basic dance technique, improvisation, and composition designed to help the actor improve use of the body as an expressive instrument and to develop the imagination. Students prepare movement studies which focus on the design and rhythmic shape of a sequence of movement at various levels of abstraction.

201 Dance and Movement for the Theatre Spring. 3 credits. Prerequisite: Theatre Arts 200.
P. Lawler.
A continuation of Theatre Arts 200.

[205 Contemporary Composers and Choreographers 3 credits. Not offered 1979–80.]

210 Beginning Dance Composition and Music Resources (also Women's Physical Education 210) Fall. 4 credits. Prerequisites: Music 141, intermediate technique level, and permission of instructor. Concurrent enrollment in a technique class at the appropriate level is required.
J. Morgenroth.
Theatre Arts 210 and 211 are designed to develop resources in movement, and music as it relates to dance. Students prepare studies concerned with use of space, time, body design, and dynamics. Various approaches to the structuring of these elements are the basis for the study of form as it applies to dance and music.

211 Beginning Dance Composition and Music Resources (also Women's Physical Education 211) Spring. 4 credits. Prerequisite: Theatre Arts 210.
J. Morgenroth.
A continuation of Theatre Arts 210.

301 Dance Technique (also Women's Physical Education 301) Fall or spring. 1 credit. S-U grades only. May be repeated for up to 4 credits. Credit is given for enrollment only in intermediate and advanced sections. Contact Women's Physical Education for schedule of sections.
Staff.

307 Asian Dance and Dance Drama (also Asian Studies 307) Fall. 3 credits. No prerequisites. May be repeated for credit.
M W F 11:15. D. Sudan.
Section 1: Indian dance. Historical background and performance technique of East Indian dance. The particular dance technique that will be taught will be Odissi, which is related to Bharata Natyam, one of the four classical dance forms of India. The M W classes will be Odissi movement technique. The F class will be lecture, film, and discussion based on reading assignments and papers prepared by students. The M W classes may be taken without the F class, in which case Physical Education credit may be earned, but not academic credit. Students who attend all three classes and do all work may earn both Physical Education credit and 3 units of academic credit.

[*Section 2:* Japanese Nōh theatre. Not offered 1979–80.]

310 Advanced Dance Composition (also Women's Physical Education 310) Fall. 4 credits. Prerequisite: Theatre Arts 211.
J. Morgenroth.
Problems in composition for groups and music resources for dancers.

311 Advanced Dance Composition (also Women's Physical Education 311) Spring. 4 credits.
J. Morgenroth.
Further problems in composition for groups.

[312 Physical Analysis of Movement 3 credits. Not offered 1979–80.]

314 History of Dance Fall. 3 credits.
M W F 3:35. P. Lawler.
A survey of the history of dance from ancient times to the Renaissance with emphasis on the development of theatrical forms in Western civilization.

315 History of Dance Spring. 3 credits.
M W F 3:35. P. Lawler and J. Morgenroth.
A survey of the history of dance from the Renaissance to contemporary times with emphasis on the development of theatrical forms in Western civilization.

[316 Human Biology for the Performing Arts (also Anthropology 316) Fall. 5 credits. Not offered 1979–80.]

318 Historical Dances Spring. 2 credits. Prerequisite: elementary ballet or elementary modern technique.
P. Lawler.
A sampling of the social dances from the Renaissance to the present with emphasis on pinpointing basic differences in movement styles and customs in the various periods. A majority of class time will be spent learning and performing the dances.

410 Individual Problems in Composition (also Women's Physical Education 410) Fall or spring. 3 credits. Prerequisite: Theatre Arts 311.
Staff.
Individual problems in composition.

418 Seminar in History of Dance Fall or spring. 3 credits. Prerequisites: Theatre Arts 315 or permission of instructor.
Consult instructor for description of the particular aspect of history of dance to be investigated.

Directing

398 First Principles of Directing Fall. 3 credits. Prerequisites: one semester of acting and one semester of stagecraft or stage design.
M W 2:30–4:25. R. Shank.
The structure of visual and temporal patterns as interpretation of the script; rehearsal procedures and techniques; the relationship of the technical and design arts to the directorial approach.

498 Advanced Directing Spring. 4 credits. Prerequisites: Theatre Arts 398 and permission of instructor.
M W 2:30–4:25. R. Shank.

499 Projects in Directing Fall or spring. Credit to be arranged. Prerequisite: permission of the department staff.
R. Shank.
The planning and execution of directing projects by advanced students in the public facilities of the Department of Theatre Arts.

Theatre Production and Design

260 Theatre Design Aesthetics Fall. 3 credits. Limited to majors or prospective majors.
M W F 10:10–12:05. V. Becker.
The exploration through practical experimentation of the graphic expression of ideas and concepts. Begins with the translation of simple cerebral and emotional processes into visual language. Continues towards the designer's communication of complex and multifaceted relationships to a theatre audience. Culminates in the introduction of the practical systems and conventions by which a stage design is realized and then examined.

351 Theatre Practice Fall or spring. 2 credits. May be repeated for credit. Prerequisites: previous technical assistance in Cornell University Theatre productions and permission of instructor.
K. Golden.
Advanced projects in design or technical production under the supervision of the set designer or the technical director.

352 Theatre Practice; Section 1 Fall or spring. 2 credits. May be repeated for credit. Prerequisites: previous technical assistance in Cornell University Theatre productions and permission of instructor; priority given to Theatre Arts majors.
P. Alexander.
Advanced projects in design or technical production under the supervision of the costume designer.

352 Theatre Practice; Section 2, Make-up Fall or spring. 2 credits. Prerequisite: permission of instructor.
M W 4:30–6:30. P. Alexander.
Basic make-up for the theatre, with work in ageing, character, and fantasy techniques. Class members are required to work on the makeup crew for one production, including dress rehearsals. Class projects require that students' faces be clean-shaven.

354 Stagecraft Fall or spring. 4 credits. Prerequisite: sophomore standing or permission of instructor.
M W 12:20. Staff.
Lectures and demonstrations on theatre structure and equipment, scene construction and painting, and stage lighting. Practice in scene construction and lighting for University Theatre productions.

362 Stage Lighting Spring. 3 credits. Prerequisite: Theatre Arts 354.
T R 11:15, labs to be arranged. R. Dressler.
An introduction to lighting design for the theatre, concentrating on the principal approaches for the designer using light as a medium. A technical foundation in the types and functions of the different lighting instruments, control equipment, light sources, and color are dealt with during labs.

364 Stage Design I Fall or spring. 4 credits. Prerequisite: permission of instructor.
T R 10:10–11:25. V. Becker.
Introduction to scenic design through history; theory, procedure, and practicum.

365 Stage Design II Spring. 4 credits. Prerequisite: Theatre Arts 364.
T 2:30–5. V. Becker.
A continuation of Stage Design I. Advanced problems in rendering, model construction, special effects, budgeting, and scheduling.

366 Costume Design I Fall. 4 credits. Prerequisite: permission of instructor.
T R 12:20; 2 class hours and 4 lab hours to be arranged. P. Alexander.
Introduction to costume design involving color, space, line, and drawing techniques. Students learn to use period research. Students must commit themselves to work on one mainstage production.

367 Costume Design II Spring. 4 credits. Prerequisites: Theatre Arts 366 or permission of instructor.
T R 12:20; 4 lab hours to be arranged.
P. Alexander.
A continuation of Costume Design I with emphasis on design and research. Requires same commitments as 366.

465 Advanced Stage Design Fall. 4 credits. Prerequisites: Theatre Arts 364 and 365.
R. Dressler.
Projects in studio theatre and mainstage production. Exercises focus on practical problems encountered by the working designer. Familiarization with professional organizations, unions, and examinations.

466 Advanced Costume Design Fall and spring. 4 credits. Prerequisites: Theatre Arts 366 and 367 or permission of instructor.
2 class hours and 4 lab hours to be arranged; individual conferences as needed. P. Alexander.
Large-scale projects involving total show design and defense. May design and build studio show. Students must commit themselves to work on one mainstage production.

467 Costume Construction I Fall. 4 credits. Prerequisites: permission of instructor and some knowledge of sewing.
M W 10:10–11:40; 3 hours of work in costume shop each week. Staff.
Drafting basic patterns for the stage and basic costume construction techniques.

468 Costume Construction II Spring. 4 credits. Prerequisite: Theatre Arts 467 or permission of instructor.
M W 10:10–11:40; 3 hours of work in costume shop each week. Staff.
Individual projects patterning historical theatrical costumes.

Playwriting

348 Playwriting Fall. 4 credits. Prerequisite: permission of instructor.
T 2–4:25. I. Hauptman.
A laboratory for the discussion of student plays. Each student is expected to write two or three one-act plays, or one full-length play.

349 Advanced Playwriting Spring. 4 credits.
T 2–4:25. I. Hauptman.
A continuation of Theatre Arts 348.

Freshman Seminars

120 Modern Drama and Modern Production Fall or spring. 3 credits. Primarily for freshmen.
T R 12:20–1:35. Katherine Solow.
A study of modern European drama in its philosophical contexts. Topics covered will include: surrealism, existentialism, theatre of the absurd, theatre of cruelty, and others. Readings will include works by Breton, Artaud, Genet, Sartre, Ionesco, Beckett, Camus, Brecht, and Weiss.

130 Tragedy and Comedy Fall or spring. 3 credits. Primarily for freshmen.
M W F 9:05. Robert Elliott.
Studies in the development of Western drama from the Greek classics through the twentieth century. The major units of the course will be Greek tragedy, Roman comedy, Shakespearean tragedy, the Commedia dell'Arte, Racinian tragedy, sentimental comedy, Romantic tragedy, social comedy, and tragicomedy. The plays will be studied in the contexts of the social, theoretical, and critical movements of the periods.

140 Script and the Stage Fall or spring. 3 credits. Primarily for freshmen.
T R 10:10–11:25. David Rosengarten.
A chronological investigation of some of the highlights of world dramatic literature. The course will focus on the following questions: What are the major trends in the history of dramatic literature? What is the relationship between dramatic literature and theatrical production? Such dramatists as Aeschylus, Plautus, Tourneur, Ibsen, Beckett, and Stoppard will be considered.

Theatre History, Literature, and Theory

240 Introduction to the Theatre Fall or spring. 3 credits.
M W F 11:15. J. Haarstick.
A survey of the elements of drama and theatre intended to develop appreciation and rational enjoyment of the theatre in all its forms. Not a production course.

300 Independent Study Fall or spring. 1–4 credits; no more than 4 credits each semester. May be repeated for credit. Limited to upperclass students. Prerequisite: permission of the department staff member directing the study.
Staff.
Individual study of special topics.

325 Classic and Renaissance Drama (also Comparative Literature 352) Fall. 4 credits.
T R 2:30–3:45. E. Murray.
Readings in world drama from the Greeks to Shakespeare, including dramatists such as Aeschylus, Sophocles, Euripides, Aristophanes, Plautus, Seneca, Calderón, Kyd, Marlowe, Shakespeare, Jonson, and Webster, with emphasis on the Greek and Elizabethan periods.

326 European Drama, 1660 to 1900 (also Comparative Literature 353) Fall. 4 credits.
T R 10:10–11:25. S. Williams.
Readings from major dramatists from Molière to Ibsen, including such authors as Racine, Congreve, Sheridan, Schiller, Goethe, Hugo, Büchner, Gogol, Turgenev, Zola, Hauptmann, and Chekhov.

327 Modern Drama (also Comparative Literature 354) Spring. 4 credits.
M W F 1:25. I. Hauptman.
Readings from major dramatists of the twentieth century, including Ibsen, Chekhov, Strindberg, Shaw, Pirandello, Ionesco, Brecht, Beckett, and Pinter.

333 History of the Theatre I Fall. 4 credits.
M W F 11:15. S. Williams.
A survey of the characteristics of primitive theatre and of theatrical styles and production modes in Classical Greece and Rome, medieval Europe, the Orient, Renaissance England, and Spain.

334 History of the Theatre II Spring. 4 credits.
M W F 11:15. S. Williams.
A survey of theatrical styles and production modes since 1642. Among the periods considered are Renaissance France, the English Restoration, the eighteenth and nineteenth centuries in England, France, and Germany, and the modern international stage.

[335 American Drama and Theatre Not offered 1979–80.]

336 Theory of the Theatre and Drama Fall. 4 credits.
M W F 2:30–3:20. I. Hauptman.
A study of various theories of dramatic form and theatrical presentation from Aristotle and Horace to Artaud and Brecht, with emphasis on the romantic and modern period, including Lessing, Hugo, Wagner, Strindberg, Stanislavsky, Appia, Craig, Yeats, Langer, Frye, Burke, Fergusson and Grotowski.

[337 Backgrounds of the Modern Experimental Theatre Not offered 1979–80.]

[425 Shakespeare: King Lear and the Stages of History (also English 425) Not offered 1979–80.]

[442 Ibsen and Chekhov (also Comparative Literature 472) Not offered 1979–80.]

[632 Critical Writing Workshop Not offered 1979–80.]

633 Seminar in Theatre History Spring. 4 credits.
S. Williams.

[636 Seminar in Dramatic Analysis and Criticism Not offered 1979–80.]

637 Seminar in Dramatic Theory Fall. 4 credits.
R 2:30–4:25. I. Hauptman.

[638 Seminar in Theory of the Theatre Not offered 1979–80.]

[672 Dramatic Literature: Tragedy (also English 672) Not offered 1979–80.]

[699 Seminar in Theories of Directing Not offered 1979–80.]

700 Introduction to Research and Bibliography in Theatre Arts Fall. 1 credit.
T 12:20–2. S. Williams.

730 Literature and the Theatre Fall and spring. 4 credits. May be repeated for credit.
Fall: M W 1:15–2:15, S. Cole; spring: S. Williams.
Analysis of various types of dramatic literature from the point of view of the theatrical medium.

880 Master's Thesis

990 Thesis and Special Problems in Drama and the Theatre

Related Courses in Other Departments

Shakespeare (English 227)

Shakespeare (English 327)

Representative English Dramas (English 372)

Shakespeare (English 427)

Dramatic Literature: Tragedy (English 672)

[Graduate Seminar: Renaissance Tragedy (English 628) Not offered 1979–80.]

Graduate Seminar: O'Neill (English 672)

Greek and Roman Drama (Classics 300)

Introduction to German Literature (German 201–202)

Modern German Drama in English Translation (German 311)

Faust (German 356)

Masterpieces of French Drama: The Classical Era (French 331)

Masterpieces of French Drama: The Modern Era (French 332)

The Rhetoric of Honor (Spanish 461)

Cinema

[374 Introduction to Film Analysis: Meaning and Value Fall. 4 credits. Not offered 1979–80; next offered 1980–81.
T R 10:10–11:30. D. Fredericksen.
Consideration of the ways films generate meaning, and of the ways we attribute meaning and value to film. The relative merits of semiotic and symbolic perspectives upon these questions. Discussion ranges over commercial narrative, documentary, and experimental film types.]

[375 History and Theory of the Commercial Narrative Cinema Fall. 4 credits. Fee for screening expenses, $5 (this fee is paid in class). Not offered 1979–80; next offered 1980–81.
T R 2–4:25. D. Fredericksen.
Within the context of history, the description, interpretation, and evaluation of commercial narrative films as works of art and as objects for mass consumption. Emphases include "the articulation of a cinematic language," "realism," "popular art," and "modernism." Contemporary methods of analysis such as the auteur theory and semiotics are introduced.]

376 History and Theory of Documentary and Experimental Film Fall. 4 credits. Fee for screening expenses, $5 (this fee is paid in class).
T R 2:30–5. D. Fredericksen.
Documentary figures covered include Vertov, Flaherty, Grierson, Ivens, Lorentz, Riefenstahl, Capra, and Jennings. Within the history of experimental film, emphases are the avant-garde of the twenties, the movement toward documentary in the thirties, and American experimental film from the forties to the present.

377 Fundamentals of 16mm Filmmaking Fall or spring. 4 credits. Limited to 12 students. Fee for maintenance costs, $10 (this fee is paid in class).
M W F 2–4:25. Staff.
The mechanics and expressive potential of 16mm filmmaking, including nonsynchronous sound. Each student makes two short films. No prior filmmaking experience is assumed.

[378 Russian Film of the 1920s and French Film of the 1960s Spring. 4 credits. Prerequisite: Theatre Arts 375. Fee for screening expenses, $5 (this fee is paid in class). Not offered 1979–80; next offered 1980–81.
T R 2–4:25. D. Fredericksen.
An intensive treatment of two distinct periods of innovation in film history and theory. Emphasis is on the relationship between theory and practice. Major figures include Eisenstein, Pudovkin, Vertov, Dovzhenko, Godard, Truffaut, Resnais, Robbe-Grillet, Bresson, and Rivette.]

379 International Documentary Film from 1945 to the Present Spring. 4 credits. Prerequisite: Theatre Arts 376. Fee for screening expenses, $5 (this fee is paid in class).
T R 2–4:25. D. Fredericksen.
Emphases is on the contemporary international documentary as a sociopolitical "force," as an ethnographic tool within and without a filmmaker's own culture, and as an artistic form with a distinct history and set of "theoretical" questions. Major figures, structures, and movements covered include Jennings, Rouquier, Leacock, Malle, Rouch, Solanas, national film boards, "Challenge for Change," "direct cinema," "cinema verité," and "revolutionary" documentary from the Third World.

475 Seminar in the Cinema I Fall. 4 credits. Theatre Arts 374 or 375, or prior work in depth psychology is recommended.
T R 10:10–11:30. D. Fredericksen.
Topic for 1979: C. G. Jung and the cinema. Readings from the three major areas of Jung's writings (personality types, the structure and dynamics of the psyche, and archetypal imagery) are considered for their usefulness in analyzing films. Contrasts between Jung and Freud are considered, as is the question of the limits of a depth psychological perspective upon film.

476 Seminar in the Cinema II Spring. 4 credits. Prerequisite: Theatre Arts 376 and 475, or permission of instructor.
T R 10:10–11:30. D. Fredericksen.
Topic for 1980: Imaginal psychology and film analysis. Readings from C. G. Jung, James Hillman, Mary Watkins, Edward Casey, and experimental filmmakers concerning the role of image-making in the life of the psyche. Films analyzed are drawn from the experimental tradition, and include those of Stan Brakhage, Harry Smith, Jordan Belson, Larry Jordan, Maya Deren, and Bruce Baille.

Centre Universitaire Américain du Cinéma à Paris

For a list of courses offered by the center and information about attending the center, contact Professor Fredericksen, 112 Lincoln Hall. Prerequisites for participation in the program are fluency in French and completion of Theatre Arts 374, 375, and 376.

Special Programs and Interdisciplinary Studies

Africana Studies and Research Center

131 Swahili Fall. 4 credits. No prerequisites.
T W 10:10. A. Nanji.
Beginning Swahili; grammar part 1.

132 Swahili Spring. 4 credits. Prerequisite: Swahili 131 or previous study of the language.
M W 11:15. A. Nanji.
Elementary reading and continuation of grammar.

133 Swahili Fall. 4 credits. Prerequisites: Swahili 131 and 132.
A. Nanji.
Advanced study in reading and composition.

134 Swahili Spring. 4 credits. Prerequisites: Swahili 131, 132, and 133, or permission of instructor.
A. Nanji.
Advanced study in reading and composition.

137 Afro-American Writing and Expression Fall. 4 credits.
Designed to promote clear and effective communication skills, using black-oriented materials as models for writing assignments and oral discussions.

138 Applied Writing Methods on Afro-American Topics Spring. 3 credits.
T R 11:15.
A writing skills course which explores traditional and nontraditional research sources, using Afro-American experiences as the primary subject matter.

171 Infancy, Family, and the Community Fall. 4 credits.
W. Cross.
Survey of key psychological dimensions of the black experience covering such issues as (1) race and intelligence; (2) black identity; (3) black family structure; (4) black English; (5) black middle class; and (6) nature of black psychology.

172 Teaching and Learning in Black Schools Spring. 4 credits. Intended for freshmen and sophomores.
T R 3:15. W. Cross.
A course designed for freshmen and sophomores that will be devoted to the history and contemporary issues of black education, such as the struggle for black studies, the development of independent black grammar, and problems of public schools in black communities.

190 An Introduction to Modern Political Systems Fall or spring. 4 credits.
An analytical interpretation of the sociopolitical and economic systems of sub-Sahara African countries as well as the nationalist struggles in southern Africa.

202 Swahili Literature Fall. 4 credits. Prerequisite: Swahili 134.
A. Nanji.
Students gain mastery over spoken Swahili and are introduced to the predominant Swahili literary forms.

203 History and Politics of Racism and Segregation Fall. 4 credits.
T R 12:20–1:25. C. Mbata.
A cross-cultural study in historical context of the evolution of racist thought and practice in southern Africa and North America.

204 History and Politics of Racism and Segregation Spring. 4 credits.
T R 12:20–1:25. C. Mbata.
The patterns of racism and segregation are dealt with in a historical context, using southern Africa and North America as case histories. Study is undertaken within a theoretical framework that broadly defines racism and segregation and their implications.

219 Issues in Black Literature Fall. 4 credits.
An examination of literature written for black children, including an analysis of the literature as it pertains to black life from 1960 to the present. Students write a pamphlet containing their essays, fiction, and poetry, and compile a bibliography of literature for black children.

231 Black Political Thought in the United States Fall. 3 credits.
M W F 3:10–4.
This is an introductory course that will review and analyze the major political formulations developed and espoused by black people in the struggle for liberation. Such themes as slave resistance, nationalism, Pan-Africanism, emigration, anti-imperialism, socialism, and the political thought of black women will be discussed. Black political thought will be viewed in its development as responses to real conditions of oppression and exploitation.

283 Black Resistance: South Africa and North America Fall. 4 credits.
C. Mbata.
A study of black political movements in South Africa and North America and their responses to the situations of race relations that formed the contexts of their operations.

285 Black Drama Spring. 3 credits.
M W 1:25.
This course is intended to serve as an introduction to the history of black drama, and to provide the means through which students can cultivate their interests in dramaturgical criticism and production techniques. Each student in the course will read a number of black plays, write a critical paper on black drama, and participate in the production of a play.

290 The Sociology of the Black Experience Fall. 3 credits.
M W F 3:10–4. J. Turner.
An introductory course to the sociology of the black experience, and to the field of Afro-American studies. Required for all undergraduate students majoring at the Africana Center.

301 Seminar: Psychological Aspects of the Black Experience Spring. 4 credits. Prerequisite: permission of instructor.
W. Cross.
Existing research is used to raise specific questions about new cultural political awareness in the black community. The focus is on individual conversion experiences within the context of social movements. The transformations of political groups (for example, Black Panther Party) and outstanding activists and intellectuals (such as Malcolm X) are used as reference points for analytical discussion of theory.

302 Social and Psychological Effects of Colonization and Racism Spring. 4 credits. Offered alternate years.
Staff.

303 Blacks in Communication Media and Film Workshop Spring. 3 credits.
The focus is on the general theory of communications, the function of media in an industrialized society, and the social, racial, and class values implied in the communication process. There are group writing projects, a term paper, and the screening of significent American and Third World films.

344 Neocolonialism and Government in Africa: Problems of Africanization and Development Fall. 3 credits.
Designed to study the problems of government in Africa with emphasis on Ghana, Nigeria, Kenya, Uganda, Tanzania, Zambia, and Malawi.

345 Afro-American Perspectives in Experimental Psychology (also Psychology 345) Spring. 3 or 4 credits. Prerequisite: an introductory course in psychology or AS&RC 171. Offered alternate years.
A. W. Boykin.

346 African Socialism and Nation Building Spring. 4 credits.
An exploration and critical analysis of the various theories of African socialism as propounded by theorists and practitioners. Those ideas, extending from Nyerere's Ujamaa (for example, traditional social and economic patterns of African society) to Nkrumah's Scientific Socialism (such as the desirability and practicality of the Marxian type of socialism in Africa), are compared.

351 Politics in the Afro-Caribbean World: An Introduction Fall or spring. 4 credits. Offered according to demand.
A study of the social, political, economic, and psychological forces that have shaped Caribbean societies.

352 Pan-Africanism and Contemporary Black Ideologies Spring. 4 credits.
A historical study of Pan-Africanism that reviews and analyzes the literature and activities of early black Pan-African theorists and movements.

360 Ancient African Nations and Civilizations Fall. 3 credits.
T R 12:20–1:40. J. Higginson.
An introduction to African history beginning with early civilizations in pre-European Africa.

361 Afro-American History (from African Background to the Twentieth Century) Fall. 3 credits.
R. Harris.
Designed to explore major themes of the black historical experience in America from African origin to the twentieth century. A major concern is the changing status of black people over time and their attempts to cope with bondage, racism, circumscription, and oppression.

370 Afro-American History: The Twentieth Century Spring. 3 credits.
T R 2:30–3:35. R. Harris.
An exploration of major themes of the black historical experience in America during the twentieth century. The socioeconomic, political, and cultural condition of Afro-Americans is assessed, after their presence in this country for more than three hundred and fifty years.

381 Contemporary African History Spring. 3 credits.
M W 12:20–1:25. J. Higginson.
A survey of the present problems on the African continent as they appear from 1500 to the present time. Important topics include the impact of the Atlantic slave trade, the European Scramble of 1884, various forms of African resistance to colonial occupation to 1914, and the prospects of protracted social unrest in Africa south of the Zambezi River.

382 Comparative Slave Trade of Africans in the Americas Spring. 3 credits.
T R 1:25–2:30. J. Higginson.
The focus is on eighteenth- and nineteenth-century slave societies in Virginia and South Carolina in North America and the eighteenth-century slave societies in San Domingue or Haiti and to some extent in Jamaica. The slave society in Cuba during the latter part of the nineteenth century is studied.

400 Ideology and Development Fall. 4 credits.
A survey of literature on the political economy of the West African subregion. Emphasis is on contemporary West African economic problems and prospects.

410 Black Politics and the American Political System Fall. 4 credits.
The course is designed to engage students in a survey and analysis of the theoretical and empirical basis of black politics in America. It is a sociohistorical investigation and evaluation of the variety of practical political activities among black people in the United States.

420 Social Policy and the Black Community in the Urban Economy Spring. 4 credits. Offered alternate years.
J. Turner.

422 African Literature Spring. 4 credits.
The main focus is on the basic themes in the twentieth-century literature produced by Africans south of the Sahara.

425 Advanced Seminar in Black Theater Fall. 4 credits.
The course involves the study and production of the total black theater.

431 History of Afro-American Literature Fall. 4 credits.
M W F 3:10–4.
An extensive examination of the impact that Afro-American literature has had on describing, explaining, and projecting the Afro-American experience from 1619 to the present.

432 Modern Afro-American Literature Spring. 4 credits.
A study of fiction by black writers, focusing on the political and sociological component that influenced the development and growth of black writing in relationship to literary themes and attitudes current in specific periods and movements from post–World War I to the present.

460 History of African Origins of Major Western Religions Fall or spring. 4 credits. Prerequisite: sophomore status or permission of instructor.
Y. ben-Jochannan.
The course is designed to develop an understanding of the basic origins of the philosophical, theosophical, and magical-religious teachings responsible for Judaism, Christianity, and Islam.

465 Black Critique: Towards Defining and Developing a Black Aesthetic Spring. 4 credits.
A study of aesthetic, moral, and cultural values and judgments that black people can develop, recognize, and viably respect as black aesthetics.

475 Black Leaders and Movements in Afro-American History Spring. 4 credits.
T R 3:35–4:25. R. Harris.
A comprehensive analysis of the personalities, ideas, and activities central to the struggle for Afro-American liberation, ranging from eighteenth-century figures to the present time. Rebellion, emigration, assimilation, nationalism, accommodation, protest, cultural pluralism, separation, integration, and revolution are some of the central issues.

483 Themes in African History Fall. 4 credits.
M W 1:25–3:20. C. Mbata.
A study of selected themes in African history, making use of work done in related disciplines. Until further notice the selected topic will be "Women in African history."

485 Racism, Social Structure, and Social Analysis Seminar Spring. 4 credits.
W 2–4:25. J. Turner.
An examination of the social structure of American society and the relationship of racial and class categories to social stratification. An analysis of power structures and the social salience of socioeconomic connections of governmental decision makers and the corporate structure is developed.

490 Advanced Reading and Research Seminar in Black History Spring. 4 credits.
M W 1:25. C. Mbata.
Designed to help students acquaint themselves with the available sources of information and materials in black history, as well as make the maximum use of their own inclinations and interests in unearthing the material and creating a body of comprehensible conclusions and generalizations out of it.

Note: May be taken to fulfill requirements for a major in African or Afro-American studies.

495 Political Economy of Black America Spring. 4 credits.
An examination of the role that black labor has played in the historical development of United States monopoly, capitalism, and imperialism. Emphasis is on the theory and method of political economy, and a concrete analysis of the exploitation of black people as slave labor, agricultural labor, and proletarian labor.

498–99 Independent Study 498, fall; 499, spring.
Hours to be arranged. Africana Center faculty.
For students working on special topics with selected readings, research projects, etc., under the supervision of a member of the Africana Studies and Research Center faculty.

500 Political Ideology, Planning, and Development in Africa Spring. 4 credits.
Prerequisite: AS&RC 344 or 346, or permission of instructor. Offered alternate years.
C. Mbata.

505 Workshop in Teaching About Africa
4 credits. Prerequisites: AS&RC 203 and 204, or AS&RC 360 and 361, or permission of instructor. Offered alternate years.
C. Mbata.

510 Historiography and Sources: The Development of Afro-American History Fall. 4 credits. Prerequisite: upperclass or graduate standing, or permission of instructor.
T R 11:15. R. Harris.
Through a critical examination of the approach, methodology, and philosophy of major writers in this field such as James W. C. Pennington, George Washington Williams, W. E. B. DuBois, Carter G. Woodson, John Hope Franklin, Benjamin Quarles, Lerone Bennett, Jr., and Vincent Harding, the evolution of Afro-American history is traced from its origin to the present. The nature and purpose of Afro-American history, especially the role of the black historian in the context of a racist and oppressive society, is analyzed. Attention is given to sources for studying black history, and each participant fashions a conceptual framework for application to the materials and evidence of the black experience in America.

515 Comparative Political History of the African Diaspora 4 credits. Prerequisites: upperclass or graduate standing, or two of the following courses: AS&RC 203, 204, 283, 360, 361, 475, 484, 490. Offered alternate years.

520 Historical Method, Sources, and Interpretation Fall. 4 credits. Prerequisites: upperclass or graduate standing, or two of the following courses: AS&RC 203, 204, 361, 475, 484, 490. Offered alternate years.
C. Mbata.

550 Transnational Corporations in Africa and Other Developing Countries Spring. 4 credits. Prerequisites: upperclass or graduate standing, or permission of instructor.
Examines the role of transnational enterprises as an economic and political factor in the Third World, their relations with the host government and their interaction with both the private and public sectors of the economy of the host country. Special emphasis on Africa and Latin America.

551 Political History of Social Development in the Caribbean 4 credits. Offered according to demand. Prerequisite: upperclass or graduate standing or permission of instructor.

571 Seminar: Psychological Issues in the Black Community Fall. 4 credits. Prerequisite: permission of instructor.
W. Cross.
A critical examination of existing theory and research on identity development and identity transformation in Afro-American life, including black identity metamorphosis that occurs within the context of social movements. Particular attention is given to (1) the interface between social systems and identity development and maintenance; (2) dual consciousness; (3) functions of identity in daily life; (4) conversion and deconversion within the contexts of the contemporary black movement; (5) the psychohistorical implications of unidimensional theories of black self-concept; (6) the relationships among identity, behavior, and ideology.

698–699 Thesis 698, fall; 699, spring. Limited to Africana Studies and Research Center students.
Africana Center faculty.

American Studies

American studies is basically a program of coordinated study in the history and literature of the United States. Courses are drawn from a number of different departments, and students who are interested in American studies should consult the program description in the *Announcement of Academic Information*.

Ancient Mediterranean Studies

Introductory Courses

Courses that introduce the world of Mediterranean antiquity are offered by all the participating departments. These courses offer contrasting perspectives on the periods and cultures they treat; they supplement and complement each other. They may be taken simultaneously or sequentially. None require prerequisites.

200 Mediterranean Archaeology (also Classics 200 and Near Eastern Studies 280) Fall. 3 credits.
No prerequisites.
T R 12:20–1:35. J. E. Coleman, J. M. Weinstein, and guest lecturers.
An examination of the archaeological bases of Ancient Mediterranean civilization with special focus on contacts and interrelationships in the Bronze Age. Topics include: the rise of civilization in Egypt; the Bronze Age states of Syro-Palestine (Ebla, Ugarit, Byblos, etc.); the Hittites and Bronze Age Anatolia; Minoans, Mycenaeans, and their eastern and western contacts; the role of Cyprus; the invention and spread of writing; ancient shipping and trade.

Historical Surveys

Western Civilization (History 151)

The Emergence of Greek Democracy (History 265)

The Crisis of Greek Civilization (History 266)

The Roman Republic (History 267)

Rome of the Caesars (History 268)

History of Ancient Israel to 450 B.C.E. (Near Eastern Studies 243)

The Jews of the Ancient and Muslim Near East (450 B.C.E.–1204 C.E.) (Near Eastern Studies 244)

Literature, Philosophy, and Intellectual History

The Greek Experience (Classics 211)

The Roman Experience (Classics 212)

The Genius of Christianity (Classics 226)

Greek Mythology (Classics 236)

The Ancient Epic: Homer and Vergil (Classics 238)

Ancient Thought (Philosophy 210)

Freshman Seminar in Biblical Literature: Heroes and Heroines of the Bible (Near Eastern Studies 225)

Readings in Classical Hebrew Literature (Near Eastern Studies 231–232)

Literature of Ancient Israel II (Near Eastern Studies 222)

The Material Remains of Mediterranean Antiquity

Introduction to Classical Archaeology (Classics 220)

Minoan-Mycenaean Art and Archaeology (Classics 221)

Archaeology in Action I and II (Classics 232–233)

Art of Egypt and Mesopotamia (History of Art 211)

Art of the Etruscans and Romans (History of Art 212)

Ancient Seafaring (Near Eastern Studies 249)

History of Architecture I (Architecture 141)

History of Preindustrial Building (Architecture 244)

Advanced Courses

Many, though not all, of the following courses require certain prerequisites (see individual departmental listings for details). In general, the courses deal with more specialized issues and treat them in greater detail.

Historical Surveys

Thucydides and the Peloponnesian War, 432–404 B.C. (History 453)

Roman Imperialism (History 460)

Social and Economic History of Ancient Rome (History 561)

Literature, Philosophy, and Intellectual History

Greek and Roman Drama (Classics 300 and Comparative Literature 300)

Ancient Wit: An Introduction to the Theory and Form of Comic and Satiric Writing in Greek and Rome (Classics 339 and Comparative Literature 339)

Studies in Christian Origins (Comparative Literature 326)

Literature of the Old Testament (Comparative Literature 328)

Old Testament Seminar (Comparative Literature 421)

New Testament Seminar (Comparative Literature 426)

Readings in the New Testament (Comparative Literature 429)

Plato (Philosophy 309)

Special Topics in the History of Philosophy (Philosophy 315)

Topics in the Philosophy of Religion (Philosophy 363)

Plato and Aristotle (Philosophy 413)

Greek and Roman Coins (History of Art 327 and Classics 327)

The Material Remains of Mediterranean Antiquity

Archaeology of Cyprus (Classics 321 and History of Art 321)

Greek Sculpture (Classics 329)

Archaeology of the Ancient Near East (Near Eastern Studies 387 and Archaeology 310)

Archaeology of Ancient Egypt (Near Eastern Studies 388)

Biology and Society

Biology and Society I: The Biocultural Perspective (Anthropology 301 and Biological Sciences 301)

Biology and Society II: Biology, Society, and Ethics (Anthropology 302 and Biological Sciences 302)

Biomedical Ethics (Biological Sciences 205 and Philosophy 245)

Environmental Ethics (Biological Sciences 206 and Philosophy 246)

375 Independent Study Fall or spring. 1–4 credits each term.
Hours to be arranged. Staff.

400–401 Senior Seminar in Naturalistic Views of Society Before and After Darwin (also Society for the Humanities 427–428) Fall or spring. 4 credits each term. Prerequisite: permission of instructor.
W 3:35–5:15. D. J. Greenwood.
Biology and Society 400 examines the structure and use of some pre-Darwinian concepts of human biology to explain and legitimate the social order and ethical action. Concepts such as national character, purity of blood, and race are analyzed. Though detailed examples are drawn from Spain, relevant comparisons are suggested. 401 involves a review of Darwinian theory. Two major views of society and ethics that claim a basis in modern evolutionary biology are examined: social darwinism and human sociobiology. Then a comparison of naturalistic views of society before and after Darwin is made to stress continuities in Western ideas about the relationship between human nature, the social order, and ethical action.

402 Senior Seminar Spring. 4 credits. Prerequisite: Biological Sciences 302 or Anthropology 302, or permission of the instructor.
M W 2:30–4. J. Fessenden-Raden.
Topic for 1980: Our chemical environment: the social dimensions. Focus is on the economic, legal, and ethical considerations associated with the regulation of chemical toxicants in the environment. Case studies are used to include cost-benefit evaluation, an interpretation of safety hazards, and a consideration of the decision-making process.

China-Japan Program

See Asian Studies, p. 53.

College Scholar Program

The College Scholar Program is described in the *Announcement of Academic Information*.

College Scholar 396–397 Independent Study 396, fall; 397, spring. 1 or 2 credits. Permission of program office required.

College Scholar 398–399 Independent Study 398, fall; 399, spring. 3 or 4 credits. Permission of program office required.

College Scholar 498–499 Honors Research 498, fall; 499, spring. 4–8 credits. A total of 8 credits is allowed for these courses.

College Scholar Seminar Program

Information about these seminars is available from the program office, 159 Goldwin Smith Hall.

Independent Major Program

The Independent Major Program is described in the *Announcement of Academic Information*.

Independent Major 301–302 Independent Study 301, fall; 302, spring. 2 credits each term. Permission of program office required.

Independent Major 351–352 Independent Study 351, fall; 352, spring. 3 or 4 credits each term. Permission of program office required.

Independent Major 498–499 Honors Research 498, fall; 499, spring. 4 to 8 credits. A total of 8 credits is allowed for these courses.

Program of Jewish Studies

101 Jewish Contributions to Western Culture Spring. 3 credits. A Freshman Seminar.
T R 2:30–3:45. J. Cohen.
A study of the literary evidence illustrating significant influences which Judaism has had upon Western civilization—in the development of biblical monotheism, the birth of Christianity, medieval philosophy, and modern religious existentialism. Pertinent Jewish texts are considered both in their own historical and cultural context and insofar as they had an effect on the predominantly Christian culture of Western society at large.

Related Courses Sponsored by Other Departments

[Tolerance and Intolerance: The Image of the Jew in the Western Civilization (Comparative Literature 320) Not offered 1979–80.]

Yiddish Literature in Translation (German 350)

The Shteti in Modern Yiddish Fiction in English Translation (German 375 and Near Eastern Studies 375)

Topics in Yiddish Literature (German 377 and Near Eastern Studies 377)

The Jewish Problem as Political Problem (Government 300.3)

Jewish Workers in Europe and America, 1789–1948 (I&LR 381)

[The Literature of Ancient Israel I (Near Eastern Studies 221) Not offered 1979–80.]

The Literature of Ancient Israel II (Near Eastern Studies 222)

Freshman Seminar in Biblical Literature: Heroes and Heroines of the Bible (Near Eastern Studies 225)

Readings in Classical Hebrew Literature (Near Eastern Studies 231–232)

The History of Ancient Israel: to 450 B.C.E. (Near Eastern Studies 243)

Jews of the Ancient and Muslim Near East: 450 B.C.E.–1204 C.E. (Near Eastern Studies 244)

The Jews of the Christian West: 476–1948 (Near Eastern Studies 245)

Modern Hebrew Literature in English Translation (Near Eastern Studies 260–261)

Independent Study: Biblical Literature (Near Eastern Studies 326)

[The Historical Development of Rabbinic Legal Literature (Near Eastern Studies 333) Not offered 1979–80.]

Biblical Interpretation in Biblical Literature (Near Eastern Studies 334)

Readings in Post-Biblical Hebrew Literature (Near Eastern Studies 335)

Independent Study: Rabbinic Literature (Near Eastern Studies 339)

The Jewish Community Throughout History (Near Eastern Studies 343)

[Age of the Patriarchs (Near Eastern Studies 344) Not offered 1979–80.]

[History of the Ancient Near East in Biblical Times (Near Eastern Studies 345) Not offered 1979–80.]

Judaism and Christianity in Conflict (Near Eastern Studies 347)

Independent Study: Ancient Israel and the Jewish People (Near Eastern Studies 348)

361 Seminar in Modern Hebrew Literature: The National Renaissance (Near Eastern Studies 361)

[Seminar in Modern Hebrew Literature: The National Renaissance (Near Eastern Studies 362) Not offered 1979–80.]

[Seminar in Modern Hebrew Literature: The Enlightenment (Near Eastern Studies 363) Not offered 1979–80.]

Seminar in Modern Hebrew Literature: The Enlightenment (Near Eastern Studies 364)

Seminar in Modern Hebrew Literature: The Israeli Short Story (Near Eastern Studies 366)

[Seminar in Modern Hebrew Literature: The Israeli Novel (Near Eastern Studies 367) Not offered 1979–80.]

Latin American Studies

Economics of Agricultural Development (Agricultural Economics 464)

Seminar on Latin American Agricultural Policy (Agricultural Economics 665)

Geography and Appraisal of Soils of the Tropics (Agronomy 401)

Management Systems for Tropical Soils (Agronomy 480)

[The Discovery of America (Anthropology 150) Not offered 1979–80.]

The Earliest Civilizations (Anthropology 250)

Urban Anthropology (Anthropology 313)

Ethnology of the Andean Region (Anthropology 333)

Interpretation of the Archaeological Record (Anthropology 352)

[Archaeology of the Americas I (Anthropology 354) Not offered 1979–80.]

Archaeology of the Americas II (Anthropology 355)

Ethnohistory (Anthropology 418)

Indians of Mexico and Central America (Anthropology 432)

Investigation of Andean Institutions: Archaeological Strategies (Anthropology 435)

Mesoamerican Thought and Culture (Anthropology 456)

Seminar in Archaeology: The Maya (Anthropology 494)

Andean Symbolism (Anthropology 632)

Andean Research (Anthropology 633)

[Problems in Archaeology: Early Man in America (Anthropology 663) Not offered 1979–80.]

[Problems in Archaeology: The Andes (Anthropology 664) Not offered 1979–80.]

Regional Planning and Development in Developing Nations (City and Regional Planning 670)

Seminar in Project Planning in Developing Countries (City and Regional Planning 773)

Economic History of Latin America (Economics 325/525)

Economic Problems of Latin America (Economics 565)

Cuba: Culture and Revolution (Government 335)

Politics of Latin America (Government 340)

[Latin American Society and Politics (Government 655 and Sociology 655) Not offered 1979–80.]

[Latin American History to 1825 (History 210) Not offered 1979–80.]

[Latin American History since 1825 (History 211) Not offered 1979–80.]

Agrarian Societies in Latin American History (History 347)

Colonial History of Spanish America (History 414)

Contemporary Brazil (History 348 and Sociology 368)

Comparative Slave Systems in the Americas (History 449)

[Seminar in Latin American History (History 649) Not offered 1979–80.]

Special Studies of Problems of Agriculture in the Tropics (International Agriculture 602)

Elementary Portuguese (Portuguese 121–122)

Portuguese Intermediate Composition and Conversation (Portuguese 203–204)

[Advanced Composition and Conversation (Portuguese 303–304) Not offered 1979–80.]

Portuguese Advanced Readings (Portuguese 305–306)

Seminar in Portuguese Linguistics (Portuguese 700)

Quechua Elementary Course (Quechua 131–132)

Quechua Intermediate Course (Quechua 133–134)

Seminar in Quechua Linguistics (Quechua 700)

Introduction to Hispanic Literature (Romance Studies 201)

Intermediate Spanish Grammar and Composition (Romance Studies 212)

Advanced Spanish Grammar and Composition (Romance Studies 312)

Readings in Sixteenth- and Seventeenth-Century Hispanic Literature (Romance Studies 315)

Readings in Modern Hispanic Literature (Romance Studies 316)

Highlights in Modern Spanish-American Literature (Romance Studies 317)

Latin American Civilization (Romance Studies 323)

Cuba: Culture and Revolution (Romance Studies 335 and Government 335)

Form and Formlessness in the Novel of the Generation of 1898 (Romance Studies 389)

Quixote and Modern Hispanic Novel (Romance Studies 446)

Carlos Fuentes (Romance Studies 639)

[After the Revolution: Mexico and Cuba (Sociology 367) Not offered 1979–80.]

Contemporary Brazil (Sociology 368)

Research Seminar in Population (Sociology 632)

[Latin American Society and Politics (Sociology 655 and Government 655) Not offered 1979–80.]

History of the Spanish Language (Spanish 401–402)

Applied Linguistics of Spanish (Spanish 407)

[Grammatical Structure of Spanish (Spanish 408) Not offered 1979–80.]

Hispanic Dialectology (Spanish 601)

Linguistic Structure of Ibero-Romance (Spanish 602)

Contemporary Theories of Spanish Phonology (Spanish 603)

Contemporary Theories of Spanish Grammar (Spanish 604)

Seminar in Hispanic Linguistics (Spanish 700)

Law and Society

The courses listed below currently qualify for the concentration in law and society.

Law and Culture (Anthropology 328)

Politics and Culture (Anthropology 329)

[Law in the Context of Culture (Anthropology 627) Not offered 1979–80; next offered 1980–81.]

[Introduction to Roman Law (Classics 304) Not offered 1979–80.]

[Biblical Law (Comparative Literature 325) Not offered 1979–80.]

Public Regulation of Business (Economics 352)

Industrial Organization and Regulation (Economics 651)

The Nature, Functions, and Limits of Law (Government 313)

[Common Law and Lawyers in America (Government 314) Not offered 1979–80.]

[Law and Social Science (Government 324–325) Not offered 1979–80.]

[Civil Liberties in the United States (Government 327) Not offered 1979–80.]

[Constitutional Politics (Government 328) Not offered 1979–80.]

[International Law (Government 389) Not offered 1979–80.]

English Constitutional History to 1600 (History 250)

English Constitutional History 1600 to Present (History 255)

[American Constitutional Development (History 318) Not offered 1979–80; next offered 1980–81.]

Early Development of Anglo-American Common Law (History 359)

Church and the State During the Middle Ages (History 367)

Law and Authority in the American Mind (History 430)

Law, Society, and Morality (Philosophy 342)

Contemporary Ethical Theory (Philosophy 441)

Sociology of Law (Sociology 348)

[Prisons and Other Institutions of Coercion (Sociology 352) Not offered 1979–80.]

[Criminology (Sociology 353) Not offered 1979–80.]

Legal Methods (Engineering CEE B614)

The Law and Environmental Control (Engineering CEE B615)

Labor Relations, Law, and Legislation (Industrial and Labor Relations 201)

Protective Labor Legislation (Industrial and Labor Relations 341)

Employment Discrimination and the Law (Industrial and Labor Relations 684)

Medieval Studies

Freshman Seminars

101 The Literary Experience of the Middle Ages I
Fall. 3 credits.
M W F 8 or 9:05 or 12:20. Staff.
An exploration of several major works and their historical, social, and philosophical contexts. Readings usually include: *Beowulf*, Old English poetry, an Icelandic saga, an Arthurian romance by Chrétien de Troyes, *Tristan and Isolde*, selections from Chaucer or Malory, and a "medieval" work by a modern writer such as J. R. R. Tolkien or T. H. White.

102 The Literary Experience of the Middle Ages II
Spring. 3 credits.
M W F 9:05 or 11:15 or 12:20. Staff.
An exploration of several major works and their historical, social and philosophical contexts. Readings for discussion usually include: an Icelandic saga, a Germanic epic *(Nibelungenlied)*, an Arthurian romance of Chrétien de Troyes, the Grail quest *(Parzival)*, selections from Chaucer or Malory, and a "medieval" work by a modern writer such as J. R. R. Tolkien or T. H. White.

For further information about the following and related courses, including those offered in alternate years, consult the listings for Classics, comparative literature, English, history, history of art, modern languages and linguistics (including Germanic studies, Romance studies, and Russian literature), music, Near Eastern studies, philosophy, and the Society for the Humanities; or contact the medieval studies program director, James J. O'Donnell, 27 Goldwin Smith Hall.

Classics

[202 New Testament Greek Not offered 1979–80.]

216 Virgil

226 The Genius of Christianity

[337 Ancient Philosophy of Science Not offered 1979–80.]

[366 Late Latin Not offered 1979–80.]

368 Medieval Latin Literature

[412 The Latin Epic after Virgil Not offered 1979–80.]

[423 Vulgar Latin Not offered 1979–80.]

426 Augustine

[428 The Church of the Fathers Not offered 1979–80.]

679–680 Latin Seminar

Comparative Literature

326 Studies in Christian Origins

328 The Literature of the Old Testament

343 Medieval Literature

[344 Dante in Translation Not offered 1979–80.]

[349 Women in Medieval Literature Not offered 1979–80.]

[359 Being, God, and Mind:The Key Concepts of European Thought from Plato to Vico Not offered 1979–80.]

421 Old Testament Seminar

426 New Testament Seminar

429 Readings in the New Testament

[441 The Other World in Medieval Romance Not offered 1979–80.]

[446 Allegory and Symbolism Not offered 1979–80.]

English

310 Old English in Translation

313 Middle English Literature

319 Chaucer

[414/614 The Middle English Lyric and the European Tradition Not offered 1979–80.]

415 The English Language

611 Readings in Old English

612 *Beowulf*

613 Middle English Literature

614 The Middle English Lyric and the European Tradition

615 The English Language

619 Chaucer

620 *Piers Plowman*

710 Graduate Seminar in Medieval Literature: Bibliography and Methodology

[712 Advanced Old English Not offered 1979–80.]

[718 Graduate Seminar in Medieval Literature Not offered 1979–80.]

French

[347 Masterpieces of Medieval Literature Not offered 1979–80.]

401 History of the French Language I

[402 History of the French Language II Not offered 1979–80.]

447–448 Medieval Literature

[602 Linguistic Structures of Old and Middle French Not offered 1979–80.]

[637 Old French Dialectology Not offered 1979–80.]

644 Medieval Seminar: The Old French Epic

[648 Medieval Seminar: *Le Roman de la Rose* Not offered 1979–80.]

[649 Introduction to French Philology Not offered 1979–80.]

German Literature

[405–406 Introduction to Medieval German Literature Not offered 1979–80.]

611 Seminar in Old Icelandic Literature I

[612 Seminar in Old Icelandic Literature II Not offered 1979–80.]

[623 Seminar in Medieval German Literature I Not offered 1979–80.]

[624 Seminar in Medieval German Literature II Not offered 1979–80.]

[753 Tutorial in Middle High German Literature Not offered 1979–80.]

Germanic Linguistics

401 Introduction to Germanic Linguistics

402 History of the German Language

[602 Gothic Not offered 1979–80.]

603–604 Old Saxon, Old High German, Old Low Franconian, Old Frisian

[605 Structure of Old English Not offered 1979–80.]

[606 Topics in Historical Germanic Linguistics Not offered 1979–80.]

[607 Topics in Historical Germanic Morphology Not offered 1979–80.]

[608 Topics in Historical Germanic Syntax Not offered 1979–80.]

609–610 Old Icelandic

[611 Readings in Old High German and Old Saxon Not offered 1979–80.]

[612 Germanic Tribal History Not offered 1979–80.]

710 Seminar in Germanic Linguistics

720 Seminar in Comparative Germanic Linguistics

History

263 The Earlier Middle Ages

264 The High Middle Ages

[350 Early Renaissance Europe Not offered 1979–80.]

365 Medieval Culture 400–1150

[366 Medieval Culture 1100–1300 Not offered 1979–80.]

367 Church and State During the Middle Ages

[368 St. Francis of Assisi and the Franciscans Not offered 1979–80.]

369 The History of Florence 1250–1350

[664–665 Latin Paleography Not offered 1979–80.]

[668 Seminar in Medieval History Not offered 1979–80.]

669 Seminar in Medieval History

History of Art

230 Introduction to Art History: Monuments of Medieval Art

[332 Architecture of the Middle Ages Not offered 1979–80.]

[333 Early Medieval Art Not offered 1979–80.]

[334 Romanesque Art and Architecture Not offered 1979–80.]

[335 Gothic Art and Architecture Not offered 1979–80.]

336 Italian Late Medieval Art and Architecture

337 The Medieval Illuminated Book

[341 Flemish Painting Not offered 1979–80.]

342 Medieval and Renaissance German Art

[531 Problems in Medieval Art and Architecture Not offered 1979–80.]

Italian

327–328 Dante: *La Divina Commedia*

[334 Dante in Translation Not offered 1979–80.]

336 Boccaccio

437 Petrarch

527–528 Special Topics in the *Divine Comedy*

Linguistics

[404 Comparative Methodology Not offered 1979–80.]

410 Historical Linguistics

672 Comparative Slavic Linguistics

Music

[317/617 Music and Poetry in France: Late Middle Ages and Renaissance Not offered 1979–80.]

[481 Music in Western Europe to Josquin Des Pres Not offered 1979–80.]

783–784 Seminar in Medieval Music

[789–790 Liturgical Chant in the West Not offered 1979–80.]

Near Eastern Studies

250 Classics of Islamic Literature

253 Classical Islam

[333 The Historical Development of Rabbinic Legal Literature Not offered 1979–80.]

334 Biblical Interpretation in Rabbinic Literature

347 Judaism and Christianity in Conflict

[371 Medieval Hebrew Literature Not offered 1979–80.]

[374 The Mystics of Islam Not offered 1979–80.]

[376 Topics in the Civilization of Islam Not offered 1979–80.]

Philosophy

[214 Philosophical Issues in Christian Thought Not offered 1979–80.]

[310 Aristotle Not offered 1979–80.]

[313 Medieval Philosophy Not offered 1979–80.]

363 Topics in the Philosophy of Religion

412 Medieval Philosophy

413 Plato and Aristotle

[612 Medieval Philosophy Not offered 1979–80.]

Romance Linguistics

[321–322 History of the Romance Languages Not offered 1979–80.]

323–324 Comparative Romance Linguistics

Russian

[401–402 History of the Russian Language Not offered 1979–80.]

601 Old Church Slavic

602 Old Russian

[621 Russian Literature from the Beginnings to 1700 Not offered 1979–80.]

Spanish

401–402 History of the Spanish Language

[440–441 Medieval Literature Not offered 1979–80.]

Women's Studies

[364 Women in Medieval Literature (also Comparative Literature 349) Not offered 1979–80.]

Religious Studies

Anthropology

322 Comparative Religious Systems

320 Meaning Across Cultures

[334 Ethnology of Island Southeast Asia Not offered 1979–80.]

335 Ethnology of Mainland Southeast Asia

417 Structuralism

425 World Religions and Cultural Pluralism

611 Principles of Social Anthropological Theory

[619 Anthropological Approaches to the Study of Buddhism Not offered 1979–80.]

Asian Studies

250 Nature of Religious Experience

351 Introduction to Asian Religions

352 Mahayana Buddism

[371 Chinese Philosophical Literature Not offered 1979–80.]

[451 Japanese Religions Not offered 1979–80.]

453 Zen Buddhism

650 Asian Religions Seminar

Classics

226 The Genius of Christianity

222 Individual and Society in Classical Athens

[302 New Testament Greek Not offered 1979–80.]

366 Late Latin

426 Augustine

Comparative Literature

326 Christian Origins

328 Literature of the Old Testament

421 Old Testament Seminar

426 New Testament Seminar

429 Readings in New Testament

344 Dante

English

329 Milton

361 Early American Literature

[362 The American Renaissance Not offered 1979–80.]

[408 Paradise and Fall in Modern English Literature Not offered 1979–80.]

[662 American Transcendentalism Not offered 1979–80.]

[667 Political Religion in America Not offered 1979–80.]

History

263 The Earlier Middle Ages

264 The High Middle Ages

365 Medieval Culture 400–1150

366 Medieval Culture 1100–1300 Not offered 1979–80.]

History of Art

[210 Introduction to Art History: Beginnings of Civilization Not offered 1979–80.]

230 Introduction to Art History: Medieval Art

280 Introduction to Art History: Asian Traditions

[314 Art in Primitive Societies Not offered 1979–80.]

[315 Pre-Columbian Art Not offered 1979–80.]

[316 Art of the Ancient Near East Not offered 1979–80.]

[333 Early Medieval Art and Architecture Not offered 1979–80.]

[334 Romanesque Art and Architecture Not offered 1979–80.]

[335 Gothic Art and Architecture Not offered 1979–80.]

337 Medieval Illuminated Book

342 Medieval and Renaissance German Art

[383 The Arts of Early China Not offered 1979–80.]

385 Chinese Painting

[386 Studies in Indian and Southeast Asian Art Not offered 1979–80.]

[531 Problems in Medieval Art and Architecture Not offered 1979–80.]

Natural Resources (College of Agriculture and Life Sciences)

407 Religion, Ethics, and the Environment

611 Seminar in Environmental Values

Near Eastern Studies

225 Biblical Literature

[221 Literature of Ancient Israel I Not offered 1979–80.]

222 Literature of Ancient Israel II

231–232 Readings in Classical Hebrew Literature

243 History of Ancient Isreal: to 450 B. C. E.

244 Jews of the Ancient and Muslim Near East: 450 B.C.E.–1204 C.E.

245 Jews of the Christian West: 476–1948

250 Classics of Islamic Literature

253 Classical Islam

[282 Ancient Near Eastern Literature (also Comparative Literature 226) Not offered 1979–80.]

[311–312 Advanced Arabic: Readings in the Qur'an and Qur'an Commentary Not offered 1979–80.]

[333 The Historical Development of Rabbinic Legal Literature Not offered 1979–80.]

334 Biblical Interpretation in Biblical Literature

343 The Jewish Community Throughout History

[344 Age of the Patriarchs Not offered 1979–80.]

[345 History of the Ancient Near East in Biblical Times Not offered 1979–80.]

347 Judaism and Christianity in Conflict

[374 The Mystics of Islam Not offered 1979–80.]

[376 Topics in the Civilization of Islam Not offered 1979–80.]

[442 Seminar in Jewish History: The Medieval Church and the Jews Not offered 1979–80.]

Jewish Studies

101 Jewish Contributions to Western Culture

Philosophy

213 Existentialism

[214 Philosophical Issues in Christian Thought Not offered 1979–80.]

[263 Reason and Religion Not offered 1979–80.]

[313 Medieval Philosophy Not offered 1979–80.]

315 Special Topics in the History of Philosophy: Heidegger

363 Topics in the Philosophy of Religion: The Problem of Evil

Russian and Soviet Studies

Details regarding the major in Russian and Soviet Studies will be found in the *Announcement of Academic Information*. All courses offered by the Department of Russian Literature and Russian language courses offered by the Division of Modern Languages are relevant, as well as courses relating to Russia, the Soviet Union and Eastern Europe in the Departments of Economics, Government, History, and Music and in the School of Industrial and Labor Relations and the College of Human Ecology.

Program on Science, Technology, and Society

Biology and Society I: The Biocultural Perspective (Anthropology 301 and Biological Sciences 301)

Biology and Society II: Biology, Society, and Ethics (Anthropology 302 and Biological Sciences 302)

Biomedical Ethics (Biological Sciences 205 and Philosophy 245)

Environmental Ethics (Biological Sciences 206 and Philosophy 246)

Our Chemical Environment: the Social Dimensions (Biology and Society 402)

Naturalistic Views of Society Before and After Darwin (Biology and Society 400–401 and Society for the Humanities 427–428)

Science, Technology, and Public Policy (B&PA NPA 504 and Government 426)

Impact and Control of Technological Change (City and Regional Planning 540, Economics 302, and Government 302)

Politics of Technical Decisions I (City and Regional Planning 541, Government 628, and B&PA NPA 515)

Politics of Technical Decisions II (City and Regional Planning 542, Government 629, and B&PA NPA 516)

The Computerized Society (Computer Science 305)

Social Implications of Technology (Engineering CEE B305)

[Seminar in Technology Assessment (Engineering CEE B416 and College Scholar 464) Not offered 1979–80.]

Environmental Law (Engineering CEE B615)

Technology, Society, and the Human Condition (Engineering M&AE 302)

Urban Affairs Laboratory (Government 312)

[International Law (Government 389) Not offered 1979–80.]

Defense Policy and Arms Control (Government 484)

International Politics of Energy (Government 490)

Social History of Western Technology (History 380)

Problems in the History and Philosophy of Biology (History 386 and Philosophy 386)

[Science, Technology, and Law (Law 582) Not offered 1979–80.]

Science and Human Nature (Philosophy 286)

[Politics of I.Q. (Psychology 443) Not offered 1979–80.]

Science, Technology, and Social Change (Rural Sociology 424)

Sociology of Science and Technology (Sociology 255)

Social and Political Studies of Science (Sociology 355 and City and Regional Planning 340)

Society for the Humanities

Unlike other courses, the seminars offered by the society begin the *second* week of each semester. These seminars are open to graduate students and suitably qualified undergraduates. Students wishing to attend should telephone the center (256-4725) early in the first week of the term to arrange a short interview with the fellow offering the course. There are no examinations, and it is at the discretion of the fellow whether to require only oral reports, or, in addition, a research paper. Students wishing credit for the course should formally register in their own college. Persons other than those officially enrolled may attend as visitors with permission of the fellow.

101 Science as Literature Either term. 3 credits. T R 10:10–11:25. J. Lumley.
Science as literature focuses on two voices: that of the scientist and that of the nonscientist. By reading Darwin, Einstein, and Bronowski, for example, we explore who the scientist is, how he does his research, how or if he differs from his colleagues in the arts, what his responsibilities are to society. By reading Koestler and Calvino, we examine the

reflection of science in nonscientific writing. The interaction of science and literature is of primary concern.

102 Science as Literature Spring. 3 credits.
M W F 8–8:50. J. Lumley.
Robert Ornstein claims that science turns the impossible into the boring. Einstein contends that science, in its purest form, uncovers "the grandeur of reason incarnate in existence." In readings, ranging from Galileo to Freud to Koszinsky, we shall try to discover how a discipline can be so variously defined and described.

390–391 Art and Society in Modern China 390, fall; 391, spring. 4 credits per term.
Fall: discussions, W 2:30–4:30; some T evenings for slide shows or films, 7:30–9. Spring: hours to be arranged. S. Cochran, M. Young.
The relationship between the visual arts and social change in China from the seventeenth century to the present. The value of art as a reflection of social reality and as an agent for social reform is analyzed on the basis of a variety of visual materials, which range from calligraphy, paintings, and porcelains of the seventeenth and eighteenth centuries to woodblock prints, photographs, and films of the nineteenth and twentieth centuries.

413 Humanistic Interpretations of Spanish History Fall. 4 credits.
W 1:25–3:10. C. Gibson.
A review of selected themes of humanistic interest in Spanish history, including Christian-Moslem relations, Erasmianism, the Valladolid debate, and the Black and White legends. The humanistic implications of modern interpreters of Spanish history, such as Ortega, Vicens Vives, and Américo Castro are considered. The purpose is to assess the character of humanistic interpretation as it has been applied to Spanish history traditionally and in modern times.

414 Colonial History of Spanish America Spring. 4 credits.
W 1:25–3:10. C. Gibson.
Key topics in Spanish American colonial history are examined from discovery and conquest to the Bourbon Reforms and the independence movement. Emphasis is on recent bibliography and the interpretations of the past twenty years.

415 Exchanges of Structural Ideas in Literature and Music Fall. 4 credits.
M 1:25 — 3:10. H. Danuser.
An interdisciplinary exploration of cooperation between the sciences of literature and music. Literature (poetry, novel, theater) based on principles of sound, structure and form in music are explored. The origins and development of musical poetry and musical prose from the Vienna classic to Schoenberg are studied.

416 Theory and Practice of Research into Musical Reception, Based on the Examples of Beethoven, Wagner, and Mahler Spring. 4 credits.
M 1:25–3:10. H. Danuser.
Certain theoretical problems of the reception of music, and some examples of topos research (Mahler, Beethoven), as well as questions of the history of the Bayreuth Festival. Problems of reception in composition (such as Wagner's reception of Beethoven and the reception of Mahler by the avant-garde since 1960) are considered.

417–418 Making Inherited Thought Manifest, as Exemplified in the Re-presentation of Key Concepts of Weimar Humanism through the Application of Recent Work in Structuralism and Rhetoric 417, fall; 418, spring. 4 credits per term.
Reading knowledge of French and/or German useful.
M 3:35–5:20. R. H. Stephenson.
The seminar attempts to show that the aesthetic model offered by Goethe and Schiller has advantages over the linguistic model contemporary structuralists use with respect to literature; and that by building the latter into the former, a powerful and illuminating model can be produced for both art and culture. The seminar discusses how far Weimar humanism, as presented, fulfills the demands made on humanistic education.

419 Humanity and Animality: Social Anthropology and Sociobiology Fall. 4 credits.
T 3:35–5:20. E. Leach.
The focus is on the divide which separates those who consider that social/cultural anthropology is "a natural science of society" and those who treat it as a humanistic discipline related to linguistic philosophy. How far does the self evident fact that there are biological bases for human social behavior justify recent assertions (e.g. in the work of Marvin Harris and E. O. Wilson) that details of ethnography are ecologically or biologically "determined?" Alternatively how do the structuralists' imaginative exercises in pattern recognition relate to the empirical data of biology?

421 Post-Structuralism Fall. 4 credits. Reading knowledge of French useful.
T 1:25–3:10. M. Ryan.
The question of the relationship between theory and practice in the post-structuralist era. Readings in Lacan, Foucault, Derrida, Deleuze. Political, pedagogical, and literary critical uses of these philosophers in England (Coward, *Materialism and Language*, the journal *Ideology and Consciousness);* America (The Yale School *Deconstruction and Criticism,* Spivak et al. *Deconstruction-Work,* the journal *Social Text);* and Canada (the journal *Cine-tracts).*

422 The Marxian Legacy Spring. 4 credits. Reading knowledge of German useful.
T 1:25–3:10. M. Ryan.
Readings in Marx's major texts, from the *German Ideology* to *Capital 1.* The subsequent philosophical history of "Marxism" is traced through readings in Lenin, Gramsci, Lukács, Sartre, Marcuse, Althusser, and Poulantzas. The seminar focuses on two questions — the concept of ideology and the problem of the State.

423 Method in Intellectual History Fall. 4 credits.
W 1:25–3:10. D. La Capra.
An investigation of the value and limitations of significant approaches to intellectual history. Among the topics treated is the relationship between intellectual history, literary criticism, and philosophy. An attempt is made to work out a notion of intellectual history as a critical history of texts. Readings include Ernst Cassirer, Hayden White, Jürgen Habermas, and Jacques Derrida.

424 *Madame Bovary* on Trial Spring. 4 credits.
W 1:25–3:10. D. La Capra.
The problem of a general history of a specific text: Flaubert's *Madame Bovary.* The following topics are discussed: sociopolitical, philosophical, and literary contexts of the novel; Flaubert's life and his understanding of writing; the problem of the place of a given text in the *corpus* of a writer; the "juridical" reading of the novel at Flaubert's trial and its relation to the social reception of the novel; the canonization of the novel as a classic and the varying interpretations of it over time by critics; the problem of arriving at a "competent" reading of the novel.

425 The Mental World of the English People, 1450–1750 Fall. 4 credits.
R 3:35–5:20. M. MacDonald.
The relationships between systems of thought and social change in early modern England. Alterations in popular beliefs about the self, the family and society, political and social protest, religion and magic are discussed. The course also tests the usefulness to historians of anthropological theories about the connections between thought and action.

426 Literature and Social Change in Historical Perspective Spring. 4 credits.
R 3:35–5:20. C. Reynolds.
Marxism and culture, social realism in the arts, and protest literature in the Third World; the connections between literature, society and politics during periods of revolutionary or dramatic developmental change. After general reading, specific literary and historical traditions are chosen for consideration. Selections depend on the interests of seminar members (the instructor's special field is Southeast Asia).

427 Naturalistic Views of Society Before Darwin Fall. 4 credits.
W 3:35–5:20. D. J. Greenwood.
The structure and use of some pre-Darwinian concepts of human biology to explain and legitimate the social order and ethical action are examined. Concepts such as national character, purity of blood, and race are analyzed. Though detailed examples are drawn from Spain, relevant comparisons are suggested.

428 Naturalistic Views of Society After Darwin Spring. 4 credits.
W 3:35–5:20. D. J. Greenwood.
After a review of Darwinian theory, two major views of society and ethics that claim a basis in modern evolutionary biology are examined: social Darwinism and human sociobiology. Then a comparison of naturalistic views of society before and after Darwin is made to stress continuities in Western ideas about the relationship between human nature, the social order, and ethical action.

429 The Aesthetics and Ideology of Realism Fall. 4 credits.
R 1:25–3:10. M. Sprinker.
The concept of imitation in Western literature, philosophy, and art. Primary emphasis is on the conceptual problem posed by imitation in literature and the visual arts, but some consideration of the ideological weight of the realistic tradition is also included. Readings from Plato, Aristotle, Ruskin, Wittgenstein, Lukács, Balzac, Flaubert, George Eliot, Joyce, Wallace Stevens.

430 Contemporary Criticism and the Concept of Lanugage Spring. 4 credits.
R 1:25–3:10. M. Sprinker.
The role played by language in the criticism and theory of the humanities. Readings are from thinkers of the last two centuries whose work bears upon or illuminates the current state of humanistic criticism and scholarship. The continuing importance of historical research in the humanities is explored. Works discussed include selections from the following writers: Barthes, Auerbach, Spitzer, Derrida, Foucault, Kenneth Burke, Jameson, Said, Chomsky, a selection of nineteenth-century philologists.

433–434 Guided Reading Fall and spring. 2 credits per term.

435–436 Guided Research Fall and spring. 4 credits per term.

Women's Studies

100 Freshman Seminar: Women and Religion (also Religious Studies 100) Fall. 3 credits.
M W F 10:10. R. Possen.
A study of the use of the Bible in women's rights debates in the nineteenth century and today. Readings include selections from the Old and New Testaments, Elizabeth Cady Stanton's *The Women's Bible,* nineteenth-century American women's rights convention proceedings, Rosemary Ruether's *Religion and Sexism,* and Mary Daly's *Beyond God the Father.* Issues such as female clergy, divorce, birth control, and abortion are discussed in terms of religious law and changing perspectives.

101 Women in America Fall. 3 credits; with an extra research paper, 4 credits.
M W F 10:10. J. Farley.
An analysis of the place of women in the social order in twentieth-century America; an introduction to women's studies. Topics include a historical perspective, the image of women reflected in literature and art, an analysis of the life cycle using evidence from the biological sciences, an analysis of the institutions in a male-oriented society that affect women and men and their lives together, and prospects for change in the future.

102 Freshman Seminar: Sex Roles and Leadership Spring. 3 credits.
J. Farley.
The social conditions which have made it possible for individual men and women to emerge as leaders in American society from 1607 to the present are analyzed. Readings include social science research reports and selected autobiographies.

103 Freshman Seminar: Writing as Women Fall. 3 credits.
M W F 10:10 or T R 10:10. J. Aidelberg, T. Blau.
Through autobiographical and introspective writing, experience as girls and women is confronted. In seminars and individual conferences, development of a clear, persuasive writing style will be stressed. Selected readings drawn from works by Maya Angelou, Colette, Virginia Woolf, Toni Morrison, Lillian Hellman, Doris Lessing, Maxine Hong Kingston, Simone de Beauvoir, and others are discussed.

105 Freshman Seminar: Feminine and Masculine Ideals in Japanese Culture (also Asian Studies 105) Fall. 3 credits.
M W F 1:25. K. Brazell.
In its long history, Japanese culture has developed a large number of role models — the aristocrat, poet-priest, warrior, entertainer, "salary man," and "education mama" — and idealized them in its literature and art. Japanese concepts of femininity and masculinity are studied to provide students with exposure to a new culture and new perspectives on their own culture.

The Family in Modern Society (Human Development and Family Studies 150) Fall. 3 credits. Limited to freshmen and sophomores except by permission of instructor.
M W F 1:25. B. Richardson.

205 Women and the Media (also Sociology 205) Spring. 3 credits.
M W F 10:10. C. Cohen.
Analysis of: (1) the role of the mass media in the formation of the female consciousness and the ideology of sexism; (2) sexism in the media as a manifestation of contemporary patriarchy; (3) the uses of sexism in the media to meet the economic needs of capitalism, specifically the consumer economy.

207 Freshman Seminar: The Family in American History (also History 207) Spring. 4 credits.
M 1:25–3:15. M. B. Norton.
The history of the American family is considered from the perspective of a variety of sources — qualitative analysis, autobiographies, letters, substantial scholarly studies. Each student researches some aspect of the history of his or her own family.

238 American Women and the Female Professions, 1815–Present (also Sociology 238) Fall. 3 credits.
T R 2:30–4. J. Brumberg.
The historical evolution of the female professions in America, including prostitution, midwivery, nursing, teaching, librarianship, social work, and medicine is considered. Lectures, reading, and discussion are geared to identifying the cultural patterns which fostered the conception of gender-specific work and the particular historical circumstances which created these different work opportunities. The evolution of "professionalism" and the consequences of professionalism for women, family structure, and American society is also discussed.

[244 Sex Roles and Linguistic Behavior (also Linguistics 244) Spring. 4 credits. Prerequisites: Linguistics 101, Psychology 215, or permission of instructor. S. McConnell-Ginet. Not offered 1979–80; next offered 1980–81.]

Dress: A Reflection of American Women's Roles (Design and Environmental Analysis 245) Fall. 3 credits. Limited to 40 students.
M 7:30–10:30 p.m. A. Racine.

248 Major Nineteenth-Century Female Novelists (also English 247) Fall. 4 credits. Open to nonmajors. May be credited toward the English major.
M W F 1:25. J. Blackall.
Readings include Austen, *Persuasion;* E. Brontë, *Wuthering Heights;* C. Brontë, *Jane Eyre* and *Villette;* Gaskell, *Mary Barton* or *North and South;* Stowe, *Uncle Tom's Cabin;* Eliot, *The Mill on the Floss;* Chopin, *The Awakening;* and also two imaginative sequels to *Jane Eyre,* James's "The Turn of the Screw" and Jan Rhys's *Wide Sargasso Sea.* The biographical and social circumstances surrounding these works, their critical reception within their own time, and the themes and subject matter that these novelists elected to write about are considered, and the novels are examined as works of fiction.

277 Psychology of Sex Roles (also Psychology and Sociology 277) Spring. 3 or 4 credits. Prerequisite: an introductory psychology course.
T R 10:10–11:30. S. Bem.
The question of why and how adult women and men come to differ in their overall life styles, work and family roles, personality patterns, and cognitive abilities, etc. This broad question is examined from five perspectives: (a) the psychoanalytic perspective, (b) the biological perspective, (c) the historical/cultural evolutionary perspective; (d) the child development perspective; and (e) the social psychological/contemporaneous perspective. Each of these perspectives is also brought to bear on more specialized phenomena relating to the psychology of sex roles, including psychological androgyny, women's conflict over achievement, the male sex role, equalitarian marriage relationships, female sexuality, homosexuality, and transsexualism.

Human Sexuality: A Psychosocial Perspective (Human Development and Family Studies 315) Fall. 3 credits. Prerequisite: an introductory course in human development and family studies, psychology, or sociology; or an equivalent social science course.
T R 2–4:25. H. Feldman.

321 The Anthropology of Women (also Anthropology 321) Fall. 4 credits.
M W F 2:30. K. March.
Insights anthropology can provide for the study of women are explored. These fall into two general categories: (1) those from the data dealt with by anthropology, particularly from non-Western societies, and (2) those from the theoretical perspectives anthropologists bring to those data. Focus is on a number of problems regarding the place of women in society and culture and ways in which these problems can be approached.

326 Women in American Society, Past and Present (also History 326) Spring. 4 credits.
M W F 9:05. M. B. Norton.
A survey of women's experiences in the American past, emphasizing such topics as the changing nature of housework, the women's rights movement, and the ideology of woman's place.

Contemporary Family Forms in the United States (Human Development and Family Studies 352) Spring. 3 credits.
R 2–4:25. H. Feldman.

353 Women and Politics (also Government 353) Spring. 4 credits.
Hours to be arranged. M. Katzenstein.
Considers alternative visions of the roles that women should play in society; the strategies that women have used to assert their claims to equality; the results of different governmental policies on the status of women in "liberal democratic" and in revolutionary societies.

Theories of Adult Interpersonal Relationships (Human Development and Family Studies 358) Fall. 3 credits.
R 2–4:25. H. Feldman.

363 Women in Classical Greece and Rome (also Classics 363) Spring. 4 credits.
T R 12:20. L. Abel.
The evidence about the social and political position of women in ancient Greece and Rome is examined. The origins of some Western attitudes about women are traced and general historical questions about the nature of evidence, basic chronology, and the development of political systems are addressed.

366 Women at Work (also Industrial and Labor Relations 366) Fall. 4 credits. Prerequisite: Industrial and Labor Relations 260 or equivalent.
M W 12:20. J. Farley.
Various aspects of female occupational roles in twentieth-century United States are examined. Historical, social, and legal factors that influence women's choice of careers, work socialization and training, and subsequent labor market experience are considered. Entry-level jobs, opportunities for advancement, and income of working women are compared to those of men.

422 Special Problems in the Anthropology of Women (also Anthropology 422) Spring. 4 credits. Prerequisite: Women's Studies 321 (Anthropology 321) or permission of instructor.
Hours to be arranged. K. March.
Building upon the work done in 321, research and exploration focus on a particular area of concern within the anthropology of women. Topic for 1979–80: Gender symbolism.

[426 Undergraduate Seminar in Early American History (also History 426) Spring. 4 credits. Prerequisite: permission of instructor. M. B. Norton. Not offered 1979–80; next offered 1980–81.]

438 Female Adolescence in Historical Perspective, 1815–1960 Spring. 4 credits.
T R 2:30–4. J. Brumberg.
The changing nature of female adolescence in the United States is explored using nineteenth-century primary sources available in the Department of Manuscripts and University Archives, Olin Library. Multidisciplinary reading and discussions are designed to uncover the nature of woman's childhood, patterns of authority within the family, cultural attitudes toward sexuality, female friendships, courtship patterns, and rites of passage into adulthood.

465 Feminist Literary Criticism (also Comparative Literature 465) Spring. 4 credits. Prerequisite: permission of instructor.
T R 2:30–3:45. R. Levin.
An examination of recent feminist literary criticism and theory. Categories include (1) "images of women" as they are produced in the works of male writers; (2) criticism of female authors; (3) development of a feminist poetics: modes and methodologies. Both primary and secondary texts are discussed with an eye toward students' own research

interests. Readings include works by Charlotte Brontë, Virginia Woolf, Kate Millett, Mary Ellmann, Elaine Showalter, and Tillie Olsen.

466 Women in Blue-Collar Occupations (also Industrial and Labor Relations 466) Spring. 3 credits; 4 credits for students who participate in a class project.
Hours to be arranged. J. Farley.
The focus is on women's participation in blue collar occupations in the United States. Sources of evidence include census data, evidence from social science surveys, and personal accounts.

477 Children's Literature (also English 477) Fall. 4 credits. No prerequisites. Open to juniors and seniors, and to sophomores who have received permission of the instructor.
T R 2:30. A. Lurie.
A survey of classic English and American books for children from 1850 to the present. Special topic for 1979: Folklore and fiction. Among works read are Jacobs, *English Fairy Tales;* Carroll, *Alice in Wonderland;* Kipling, *The Jungle Books;* Stevenson, *Treasure Island;* Nesbit, *The Five Children and It;* Baum, *The Wizard of Oz;* Barrie, *Peter Pan;* Grahame, *The Wind in the Willows;* and Tolkien, *The Hobbit.*

[479 Reading Woman Poets (also English 479) Spring. 4 credits. S. Siegel. Not offered 1979–80; next offered 1980–81.]

499 Directed Study Fall or spring. Variable credit. Prerequisite: one course in women's studies and permission of a member of the Women's Studies Faculty Board.
Members of the Women's Studies Program Faculty Board.

[626–627 Seminar in the History of American Women (also History 626–627) 626, fall; 627, spring. 4 credits. M. B. Norton. Not offered 1979–80; next offered 1980–81.]

Economics of Household Behavior I (Consumer Economics and Housing 626) Fall. 3 credits. S-U grades optional. Prerequisite: Economics 311 or concurrent enrollment in 311.
M W F 10:10. K. Bryant, J. Gerner.

Economics of Household Behavior II (Consumer Economics and Housing 627) Spring. 3 credits. S-U grades optional. Prerequisites: Economics 311 and CEH 626.
K. Bryant, J. Gerner.

685 Seminar in Sex Differences, Sex Roles, and Sexuality (also Psychology and Sociology 685) Fall. 4 credits. Prerequisite: permission of instructor.
R 2:30–4:25. S. Bem.
The focus is on current empirical research and theory related to sex differences, sex roles, and sexuality. The specific topics vary in an attempt to reflect research developments at the forefront of these fields.

[697 Sex Roles and Career Patterns (also Industrial and Labor Relations 697) Spring. 3 credits; or with an extra research paper, 4 credits. Prerequisite: graduate standing, or 6 credits of course work in personnel and human resource management or women's studies, or permission of instructor. J. Farley. Not offered 1979–80.]

Additional courses may be offered in women's studies. Students should contact the Women's Studies Program, 431 White Hall (256–6480), for an updated list of courses.

It may be necessary to charge students for photocopies of articles (in lieu of textbooks) for some women's studies courses. Students may check with the Women's Studies Program at the beginning of each semester for information regarding specific charges.

Division of Biological Sciences

Note: The middle digits of biological sciences course numbers are used to denote courses in specific areas: 0, general; 1 and 5, animal physiology and anatomy; 2 and 9, neurobiology and behavior; 3, biochemistry and cell biology; 4 and 5, botany; 6 and 7, ecology, systematics, and evolution; 8, genetics and development.

Current and Former Course Numbers

General Courses

101–102 Biological Sciences, Lectures 101, fall; 102, spring. 2 credits each term. Prerequisites: concurrent enrollment in Biological Sciences 103, and 104 or 208. 101 is prerequisite to 102, unless written permission is obtained from instructor. May not be taken for credit after Biological Sciences 105–106 or 109–110.

Lec, M W 9:05 or 10:10. 2 lecs each week; to accommodate these, students must reserve M W *and* F 9:05 or 10:10. Preliminary exams given at 7:30 p.m. on Oct. 9, Nov. 13, Mar. 4, and Apr. 10. W. T. Keeton.

Designed both for students who intend to specialize in biological sciences and for those specializing in other subjects, such as the social sciences or humanities, who want to obtain a thorough knowledge of biology as part of their general education. Plant and animal materials are considered together rather than in separate units. The fall semester covers the chemical and cellular basis of life, energy transformations, anatomy, and physiology. The spring semester covers genetics and development, evolution, ecology, behavior, the origin of life, and the diversity of living organisms. Each topic is considered in the light of modern evolutionary theory.

103–104 Biological Sciences, Laboratory 103, fall; 104, spring. 2 credits each term. Prerequisites: concurrent enrollment in Biological Sciences 101 and 102, or written permission of instructor.

Lec, F 9:05 or 10:10; lab, M T W or R 1:25–4:25, M or W 7:30–10:30 p.m., T R or Saturday 8–11, or F 10:10–1:10. One 3-hour lab each week and a weekly lec section for disc, special lecs, etc. To accommodate weekly lec section, students must reserve F *and* M W 9:05 or 10:10. J. C. Glase, P. R. Ecklund, M. Houck, and staff.

This is a laboratory course with the main emphasis on student design and execution of investigations in biology. In preparation for performing research, students are exposed to basic biological concepts, research methods, relevant statistical ideas, instrumentation, and laboratory techniques. Research projects include investigative design, data analysis, and communication of results and conclusions. Each student-initiated investigation leads to the production of a written research report.

105–106 Introductory Biology 105, fall; 106, spring. 4 credits each term (or 2 credits for transfer or advanced placement students, with permission of instructor). S-U grades optional, with written permission of instructor. Prerequisite: 105 is prerequisite to 106, unless written permission is obtained from instructor. All students *must* register for 105 (fall) and 106 (spring) during orientation week, whether or not they have completed course enrollment. May not be taken for credit after Biological Sciences 101–104 or 109–110.

Lec, M 12:20; 1 hour of disc and 2 office hours each week to be arranged at first lec meeting; additional study and lab hours arranged at student's convenience each week. Fall: J. Gibson, P. S. Camp; spring: D. J. Paolillo, P. S. Camp.

Designed primarily for students who intend to specialize in the biological or other sciences; also open to nonmajors who want a more comprehensive biology course than the one for nonmajors (Biological Sciences 109–110). Recommended for students whose first language is not English. The course is taught in an autotutorial format and students are expected to put in some time *each week* (students can seldom work ahead and there are severe penalties for falling behind). Laboratory work is an integral part of the course.

Course material is divided into compulsory units that must be completed by all students and optional units that offer a choice of related topics for students who wish to improve their grade. Mastery of compulsory material is required, and students are expected to achieve greater than 85 percent mastery.

The fall semester covers cell structure, function, and chemistry; energetics; animal homeostasis and anatomy; and ecology. The spring semester covers genetics and speciation; and evolution, taxonomy, biology, and ecology of plants and animals.

108 Interactive Computing for Students of Biological Sciences Spring. 1 credit. Not open to students with prior courses in computing.

Lec, T 1:25; lec every other week. H. C. Howland.

An introduction to computing using the interactive language BASIC with a discussion of other algebraic computing languages such as FOCAL and elementary FORTRAN. Students will be issued tickets for 10 hours of computing time at the Division of Biological Sciences interactive computing facility. Applications to problems in the biological sciences will be emphasized.

109–110 Biology for Nonmajors 109, fall; 110, spring. 3 credits each term. S-U grades optional. Limited to 600 students. This course may be used to fulfill the distribution requirement in the Colleges of Agriculture and Life Sciences, Arts and Sciences, and Human Ecology but may *not* be used as an introductory course for the major in biological sciences. *Note that this course may not always satisfy as a prerequisite to second- and third-level courses in biology.* Prerequisite: 109 is prerequisite to 110, unless written permission is obtained from instructor. May not be taken after Biological Sciences 101–104 or 105–106.

Lec, M W F 9:05 or 11:15; lab, M T W R or F 2–4:25 or T 10:10–12:35. Students do not choose lab sections during course enrollment; lab assignments are made during first week of classes. Each student must attend lab on alternate weeks. Preliminary exams given at 7:30 p.m. on Sept. 27, Oct. 30, Nov. 20, Feb. 21, Mar. 18, and Apr. 17. Fall: A. W. Blackler, C. Eberhard; spring: W. N. McFarland, C. Eberhard.

Students who do not plan to major in biology may take this broad introductory course in modern biology. It is not a course in social biology but

addresses itself to biological principles with academic rigor. The content is designed to appeal to anyone who seeks a comprehensive knowledge of biology as part of a general education. Laboratory sections enable small groups of students to meet with the course staff and will be used for problem-solving experiments, demonstrations, and discussions.

200 Special Studies in Biology Fall or spring. 1–3 credits. S-U grades optional, with consent of instructor. Prerequisites: written permission of instructor and of the associate director of the Division of Biological Sciences (a special form for this purpose is available in Stimson 118).
Hours to be arranged. Staff.
For students who wish to take only a portion of a regular biological sciences course, for example, only the lectures or only the laboratory in a course that includes both. Course 200 will ordinarily be taken only by transfer students who have already had training equivalent to the portion of the regular course that is to be omitted. May not be substituted for 100-level courses.

[201]–202 History of Biology (also History 287–288) [201, fall]; 202, spring. 3 credits each term. S-U grades optional. Prerequisite: 1 year of college biology. 201 is not prerequisite to 202. 201 not offered fall 1979.
Lec, T R 10:10–11:30. W. B. Provine.
An examination of the history of biology, emphasizing the interaction of biology and culture. Original writings of biologists will constitute the bulk of reading assignments. The fall semester covers the period from classical antiquity to 1900. The spring semester is devoted entirely to twentieth-century biology.

205 Biomedical Ethics (also Philosophy 245) Fall. 3 credits. Primarily for sophomores, juniors, and seniors; permission of instructor required for graduate students.
Lec, M W F 1:25. S. M. Brown.
Critical analysis of the conceptual framework in which ethical problems in biology and medicine are to be understood, debated, and solved. Problems include experimentation on humans, abortion and euthanasia, genetic diseases and recombinant DNA research, behavior modification, and the right to health care and health care systems. Each of the topics is covered in lectures and assigned readings.

206 Environmental Ethics (also Philosophy 246) Spring. 3 credits. Open to sophomores, juniors, and seniors; permission of instructor required for graduate students. Prerequisite: 1 year of introductory biology.
Lec, M W F 1:25. S. M. Brown, M. Sagoff.
Critical analysis of the conceptual framework in which environmental policies are formulated and judged. Problems include the relation of individual rights to the collective welfare with respect to property, compensation, regulation, and the exercise of eminent domain; the justice of need; moral obligations to the poor and to future generations; market and other economic models of the use of resources; private interest versus the public good; the concept of pollution; and the ideas of diversity, balance, and stability in the natural environment.

208 Biological Discovery Laboratory Spring. 2 credits. Limited to 40 students who apply for admission and are recommended by their instructors in Biological Sciences 103. Prerequisite: 103.
Lab to be arranged. J. M. Fessenden-Raden.
A more research-oriented alternative to Biological Sciences 104. Designed to instruct students in the ways that scientists ask questions about living things and design and carry out observations or experiments to answer these questions. Students work in small groups on extended research problems that they help design. Instruction is highly individualized and aimed at improving each student's ability to ask meaningful questions, organize and quantify observations, analyze research data, and relate results to previously reported biological findings. Specific research techniques will be introduced when needed.

300 Laboratory Methods in Biology Summer. 3 credits. Prerequisite: 1 year of introductory college biology. Fee: $5.
Lec and lab, M T W R F 1:30–4 for 6 weeks.
L. D. Uhler.
For students who intend to teach or follow some phase of biology as a profession. Subjects covered: collection, preservation, and storage of materials; preparation of bird and mammal study skins; injection of circulatory systems with latex; clearing and staining of small vertebrates; and preparation and staining of squashes, smears, whole mounts, and sections. No formal exams. Grade is based on required work submitted at the end of the course.

301 Biology and Society I: The Biocultural Perspective (also Anthropology 301) Fall. 3 or 4 credits (4 credits by arrangement with instructor). S-U grades optional. Prerequisite: 1 year of introductory biology. This is part of the two-semester core course for the Biology and Society major and is also available to other students who have fulfilled the necessary prerequisite.
Lec, M W F 10:10. H. Sarles.
Human biology, behavior, and institutions are viewed as the ongoing products of the interactions between human biological evolution and cultural change. These interactions are documented with reference to the evolution of the capacity for culture; human groups and institutions; language, meaning, and cultural "realities"; and major models of human nature and human institutions.

302 Biology and Society II: Biology, Society, and Ethics (also Anthropology 302) Spring. 3 or 4 credits (4 credits by arrangement with instructor). S-U grades optional. Prerequisite: Biological Sciences 301. This is the second semester of the two-semester core course for the Biology and Society major and is also available to other students who have taken 301.
Lec, M W F 10:10. S. J. Risch, S. M. Brown.
The course first documents the history of the academic and nonacademic institutional contexts of the biological and social sciences, then takes up the complex intellectual, practical, and ethical issues centering on the relationships between biological and social phenomena. Specific current problems, such as pollution, genetic counseling, and recombinant DNA research, are considered, and an effort is made to develop viable biocultural ethics for dealing with such problems.

305 Basic Immunology, Lectures (also Veterinary Medicine 315) Fall. 2 credits. Prerequisite: a course in basic microbiology or permission of instructor.
Lec, T R 9:05. A. J. Winter.
Course material covers current concepts in immunology at an elementary level, with special emphasis on the biological functions of the immune response.

307 Basic Immunology, Laboratory (also Veterinary Medicine 316) Fall. 2 credits. Prerequisite: a course in basic microbiology or permission of instructor. Concurrent enrollment in Biological Sciences 305 recommended.
Lab, T R 10:10–12:05. N. L. Norcross.
Designed to illustrate immunological concepts presented in Biological Sciences 305. Laboratory exercises are selected to familiarize students with basic humoral and cellular immune phenomena and to offer firsthand experience in immunological laboratory techniques.

309 Techniques in Animal Handling and Surgery Intersession. 2 credits. S-U grades only. Limited to 16 students, with preference given to students who are registered in an independent research course. Prerequisite: written permission of instructor. Fee: $5.
M T W R F 9–4:30. A. van Tienhoven.
Audiovisual materials and actual experience are used in this minicourse to teach students techniques needed for independent research and honors projects.

403–404 Teaching Experience 403, fall; 404, spring. 1–4 credits. S-U grades optional, with consent of instructor. Enrollment limited. Prerequisites: previous enrollment in the course to be taught or equivalent, and written permission of instructor.
Hours to be arranged. Staff.
Designed to give qualified undergraduate students teaching experience through actual involvement in planning and teaching biology courses. This experience may include leading a discussion group; preparing, assisting, or teaching a biology laboratory; teaching field biology; or tutoring. Biological Sciences courses currently offering such experience include 103–104, 105–106, 109–110, 260, 274, 307, 311, 313, 319, 324, 330, 360, 430, 464, 471, 475, 478, 487, and 491.

409 Undergraduate Research in Biology Fall or spring. Variable credit. S-U grades optional. Undergraduates must attach to their course registration material written permission from the staff member who will supervise the work and assign the grade.
Hours to be arranged. Staff.
Practice in planning, conducting, and reporting independent laboratory and library research programs.

600 Introduction to Scanning Electron Microscopy Fall or spring. 1 credit. S-U grades only. Primarily for graduate students, but open to seniors who can demonstrate a need for the course. Limited to 10 students. Prerequisite: permission of instructor.
Lec and lab to be arranged. M. V. Parthasarathy, M. K. Hausmann.
The course is a gentle introduction to the principles and the proper use of the scanning electron microscope. Emphasis is on using the instrument to observe biological specimens and on methods of preparing biological material for scanning electron microscopy.

602 (604) Advanced Electron Microscopy for Biologists I Spring. 1 credit. S-U grades only. Primarily for graduate students. Limited to 8 students. Prerequisites: Biological Sciences 603 or equivalent, and permission of instructor.
Lec, T 11:15; disc to be arranged; lab, T R 1:25–4:25; Jan. 22–Feb. 7. M. V. Parthasarathy.
High-resolution electron microscopy; problems of obtaining high-resolution electron micrographs of biological specimens; visualization of macromolecules.

603 Electron Microscopy for Biologists Fall. 3 credits. S-U grades optional. Primarily for graduate students, but open to upperclass students. Limited to 12 students, with preference given to students with research projects requiring electron microscopy. Prerequisites: either Biological Sciences 300, 313, 345, or 347, or equivalent, and written permission of instructor. Registration during course enrollment recommended.
Lec, T 11:15; lab, M W 1:25–4:25, T R 1:25–4:25, or W F 8–11. M. V. Parthasarathy.
Principles of electron microscopy; histological techniques for electron microscopy, such as ultrathin sectioning, negative staining, and metal shadowing; and interpretation of results. A brief introduction to scanning electron microscopy is also included.

604 Advanced Electron Microscopy for Biologists II Spring. 1 credit. S-U grades only. Primarily for graduate students. Limited to 8 students. Prerequisites: Biological Sciences 603 or equivalent, and permission of instructor.

Lec, T 11:15; disc to be arranged; lab, T R 1:25–4:25; Feb. 12–28. M. V. Parthasarathy.
Principles of autoradiography at both light microscopy and electron microscopy levels; incorporation of radioactive material into biological specimens for autoradiography; problems of resolution and quantitative aspects of autoradiography.

606 (604) Advanced Electron Microscopy for Biologists III Spring. 1 credit. S-U grades only. Primarily for graduate students. Limited to 8 students. Prerequisites: Biological Sciences 603 or equivalent, and permission of instructor.
Lec, T 11:15; disc to be arranged; lab, T R 1:25–4:25; Mar. 4–27. M. V. Parthasarathy.
Principles of freeze fracturing and freeze substitution techniques; freezing artifacts and interpretation of images.

608 (604) Advanced Electron Microscopy for Biologists IV Spring. 1 credit. S-U grades only. Primarily for graduate students. Limited to 6 students. Prerequisites: Biological Sciences 603 or equivalent and either Biological Sciences 602, 604, or 606.
Hours to be arranged; Apr. 1–May 1. M. V. Parthasarathy.
Project in biological ultrastructure.

702 X-Ray Elemental Analysis in Biology Spring. 1 credit. S-U grades only. Limited to 8 students. Prerequisites: Biological Sciences 600 or 603, and permission of instructor. Offered in alternate years.
Lec and lab to be arranged. M. V. Parthasarathy, M. K. Hausmann.
Principles of x-ray elemental analysis are discussed, with special reference to the energy-dispersive system. Emphasis is on qualitative elemental analysis of biological specimens and preparation of material for such analysis. A brief introduction to quantitative elemental analysis is also given.

Related Courses in Other Departments

Naturalistic Views of Society before Darwin (Biology and Society 400 and Society for the Humanities 427)

Naturalistic Views of Society after Darwin (Biology and Society 401 and Society for the Humanities 428)

Students interested in training in **biophysics** may find the following courses useful:

Bioelectric Systems (Biological Sciences 696)

Biological Phenomena and Processes (Engineering C&EE E716)

Biomechanical Systems—Analysis and Design (Engineering M&AE 565)

Biophysical Processes (Engineering A&EP 610)

Current Research Problems in Bionics and Robots (Engineering T&AM 682)

General Animal Physiology (Biological Sciences 416, 418)

Introduction to Biomechanics, Bioengineering, Bionics, and Robots (Engineering T&AM 681 and Electrical Engineering 621)

Mammalian Neurophysiology (Biological Sciences 610)

Membrane Biophysics (Engineering A&EP 615)

Photosynthesis (Biological Sciences 445)

Physics of Macromolecules (Physics 464)

Physiological Optics (Biological Sciences 695)

The Physics of Life (Engineering A&EP 206)

Vision (Biological Sciences 395)

Animal Physiology and Anatomy

274 The Vertebrates Spring. 5 credits. Primarily for sophomores; this course is a prerequisite for many advanced courses in vertebrate biology, anatomy, and physiology. Each lab limited to 21 students. Prerequisite: 1 year of introductory biology for majors. Fee: $10.
Lec, T R 10:10; lab, M W 1:25–5, M W 7–10 p.m. or T R 1:25–5. 1 midterm exam given at 7:30 p.m.
Staff.
An introduction to the evolution, classification, comparative anatomy, life history, and behavior of vertebrate animals. Laboratory dissection and demonstration are concerned with structure, classification, systematics, biology of species, and studies of selected aspects of vertebrate life.

[310 Invertebrate Zoology Fall. 4 credits. Enrollment limited, with preference given to upperclass students. Prerequisite: 1 year of introductory biology for majors. Not offered 1979–80.
Lec, W F 11:15; lab, W F 2–4:25. Each student is expected to do a significant amount of independent work; term paper may be required.
Staff.
Lectures on selected topics in the development, structure, function, and interrelations of invertebrate animals, with particular attention to phylogenetic aspects. Intensive laboratory work on representative invertebrates, utilizing living or fresh specimens wherever possible.]

311 Introductory Animal Physiology, Lectures (also Veterinary Medicine 346) Fall. 4 credits. Prerequisites: 1 year of college biology, chemistry, and mathematics.
Lec, M W F 11:15; disc to be arranged. 3 preliminary exams given at 7:30 p.m. D. N. Tapper.
A general course in vertebrate physiology emphasizing the basic characteristics of the circulatory, nervous, pulmonary, renal, and gastrointestinal systems; energy metabolism; endocrinology; and reproductive physiology. Neural and hormonal control of function is emphasized.

312 Anatomy and Behavior of the Gull Summer. 1 credit. S-U grades optional. Prerequisite: 1 year of introductory college biology. A special 1-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details and application, consult the SML office, Stimson G14. Estimated cost: $210.
Daily lecs, lec-demonstrations, and labs for 1 week. SML faculty.
The gull has been a major subject in the study of animal behavior. In this course the functional anatomy of all gull organ systems is considered and demonstrated, with emphasis on sensory, nervous, digestive, and respiratory systems. The large nesting colonies of two species of gulls on Appledore Island are used to demonstrate territoriality, aggression, mating, and other basic patterns of gull behavior.

313 Histology: The Biology of the Tissues Fall. 4 credits. Prerequisite: 1 year of introductory biology. Background in vertebrate anatomy and organic chemistry or biochemistry strongly recommended.
Lec, T R 11:15; lab, T R 2–4:25. W. A. Wimsatt.
Provides the student with a basis for understanding the microscopic, fine-structural, and functional organization of vertebrates as well as the methods of analytic morphology at the cell and tissue levels. The dynamic interrelations of structure, composition, and function in cells and tissues are stressed.

315 Ecological Animal Physiology, Lectures Fall. 3 credits. Prerequisite: 1 year of introductory biology for majors. Offered in alternate years.
Lec, M W F 10:10. W. N. McFarland.
An introductory course for students interested in ecology and physiology. The characteristics of the physical environment that are important to organisms are discussed; and representative physiological, behavioral, and morphological adaptations of vertebrate and invertebrate animals to their environments are analyzed.

317 Ecological Animal Physiology, Laboratory Fall. 1 credit. Limited to 12 students. Prerequisite: concurrent enrollment in Biological Sciences 315. Offered in alternate years.
Lab, W or R 1:25–4:25. W. N. McFarland.
Exercises involve measurement of important environmental factors in local habitats; laboratory experiments to familiarize students with the use of physiological methods; and an individual student research project dealing with specific adaptations of organisms to their environment.

318 Cellular Physiology Summer. 3 credits. Prerequisites: 1 year of introductory college biology and chemistry; or permission of instructor.
Lec, M T W R F 9:30–12 for 3 weeks. M. V. Hinkle.
A basic course on physiological processes at the cellular level. Particular emphasis is placed on eucaryotic cells and on membrane-related phenomena. Topics include active, passive, and bulk transport across membranes; structure and function of cell organelles; cell growth and proliferation; intercellular communication; excitability; contractility; and specialized cells of the immune, endocrine, and neuromuscular systems. Course may be used as an introduction to organ or medical physiology.

319 Introductory Animal Physiology, Laboratory (also Veterinary Medicine 348) Fall. 1 credit. Limited to 100 students, with preference given to students concentrating in animal physiology and anatomy. Prerequisite: concurrent or previous enrollment in Biological Sciences 311.
Lab, M T W or R 1:25–4:25. Each student must attend lab on alternate weeks. Each lab section limited to 25 students. D. N. Tapper.
Laboratory sessions consist of demonstrations, instructor-assisted experiments, and student-run experiments covering the nervous, pulmonary, renal, circulatory, and gastrointestinal systems.

[351 Biological Rhythms with a Period of 1 Day to 1 Year Fall. 1 credit. Prerequisites: 1 year of introductory biology and either Mathematics 106, 111, or 113. Not offered 1979–80; first offered fall 1980.
Lec, R 12:20. A. van Tienhoven.
Theoretical and practical aspects of circadian and circennial rhythms are considered. Selective topics such as the biological clock of plants, insects, and vertebrates are presented. Light is considered as a stimulus and as an entraining agent. The role of rhythms on migration and reproduction is emphasized.]

410 Seminar in Anatomy and Physiology Fall or spring. 1 credit. May be repeated for credit only once. S-U grades only. Limited to upperclass students.
Hours and topics to be arranged. Organizational meeting first Tuesday of each semester at 7:30 p.m. in Biology Center (Stimson G20). Staff (coordinator: W. Hansel).

412 Special Histology: The Biology of the Organs Spring. 4 credits. Limited to 12 students. Prerequisite: Biological Sciences 313 or written permission of instructor. Offered in alternate years.
Lec, W F 9:05; lab, W F 2–4:25. W. A. Wimsatt.
A continuation of Biological Sciences 313. The microscopic and ultrastructural organization of the principal vertebrate organ systems are studied in relation to their development, functional interaction

and special physiological roles. Courses 313 and 412 together present the fundamental aspects of the microscopic and submicroscopic organization of the vertebrate. The organization of the course involves student participation in lecture-seminars and independent project work supplementary to the regular work of the laboratory. The latter enables students to gain practical experience with histological and histochemical preparative techniques.

414 Vertebrate Morphology (also Veterinary Medicine 700) Spring. 3 credits. S-U grades optional. Prerequisite: graduate standing, or 274 or equivalent. (Prerequisite waived for students concentrating in animal physiology and anatomy.)
Lab, T R 2–4:25. H. E. Evans.
Student dissections of the dog serve as the basis for a functional consideration of the major component parts of the body and its organ systems. This is followed by a dissection of the cow. Other species (fish to mammal) of interest to members of the class may also be dissected.

416 General Animal Physiology: A Quantitative Approach, Lectures Spring. 3 credits. S-U grades optional. Prerequisites: 1 year of college biology and physics.
Lec, M W F 10:10. H. C. Howland.
The principles of animal physiology are developed through consideration of the functioning of cells, tissues, and organs. Specific topics discussed include respiration, metabolism, circulation, excretion, body mechanics, muscle contraction, nerve action, sensory reception, and central nervous system function. A quantitative, systems-theoretical approach is emphasized.

418 General Animal Physiology, Laboratory Spring. 2 credits. Prerequisite: concurrent enrollment in Biological Sciences 416 or equivalent.
Lec, 1 hour, to be arranged; lab, M or T 1:25–4:25. H. C. Howland.
Students are introduced to basic techniques utilized in the study of the physiology of animal tissues. Experiments cover topics dealing with respiration, properties of muscle, circulation, activity of nerves, and osmotic phenomena.

419 Undergraduate Research in Animal Physiology and Anatomy Fall or spring. Variable credit. S-U grades optional. Undergraduates must attach to their course registration material written permission from the staff member who will supervise the work and assign the grade.
Hours to be arranged. Staff.
Practice in planning, conducting, and reporting independent laboratory and library research programs.

Research credits may not be used in completion of the animal physiology and anatomy concentration requirements.

452 Comparative Physiology of Reproduction of Vertebrates, Lectures (also Animal Science 452) Spring. 3 credits. Prerequisite: Animal Science 427 or permission of instructor.
Lec, M W F 1:25. 1 preliminary exam given at 7:30 p.m. A. van Tienhoven.
Sex and its manifestations. Neuroendocrinology, endocrinology of reproduction, sexual behavior, gametogenesis, fertilization, embryonic development, care of the zygote, environment and reproduction, and immunological aspects of reproduction.

454 Comparative Physiology of Reproduction of Vertebrates, Laboratory (also Animal Science 454) Spring. 2 credits. Prerequisite: concurrent or previous enrollment in Biological Sciences 452 or permission of instructor.
Lab to be arranged; organizational meeting first Friday of semester at 2:30. A. van Tienhoven.
The laboratory provides students with an opportunity to independently design and execute experiments with limited objectives.

610 (697, 699) Mammalian Neurophysiology (also Veterinary Medicine 753) Spring. 3 credits. Limited to 16 students. Prerequisites: 2 years of college biology. Courses in biochemistry and physics recommended. Offered alternate years.
Lec and disc, R 10:10; lab, R 1:25–4:25; additional hours to be arranged. E. L. Gasteiger.
Studies include electrical activity of cells; reflexes; decerebrate rigidity; acoustic microphonic response; subcortical stimulation; and evoked and spontaneous cortical activity.

[612 Comparative Physiology, Lectures Spring. 2 credits. Limited to 12 students. Prerequisites: concurrent enrollment in Biological Sciences 614 and a background in chemistry (inorganic, organic, and biochemistry) and physics, in addition to a course in physiology. Biological Sciences 274 and 310 strongly recommended. Offered alternate years. Not offered 1979–80.
Lec, W F 11:15. Staff.
Lectures emphasize the comparison of physiological processes of organs and organ systems in various invertebrate and vertebrate classes in relation to their evolution and environmental adaptation.]

[614 Comparative Physiology, Laboratory Spring. 2 credits. Limited to 12 students. Prerequisites: concurrent enrollment in Biological Sciences 612 and written permission of instructor. Offered in alternate years. Not offered 1979–80.
Lab, T R 1:25–4:25. Staff.
Laboratories involve measurement of cardiovascular, respiratory, muscular, excretory, endocrine, alimentary, thermoregulatory, and nervous system functions in selected invertebrates and vertebrates.]

[615 Nutrition and Physiology of Mineral Elements (also Veterinary Medicine 759 and Nutritional Sciences 659) Fall. 2 credits. Prerequisites: courses in basic physiology, intermediate biochemistry, and general nutrition. Offered alternate years. Not offered 1979–80.
Lec, T R 10:10. R. H. Wasserman, R. Schwartz, D. R. VanCampen.
Lectures on nutritional aspects and physiological, biochemical, and hormonal relationships of the prominent macroelements and microelements, with emphasis on recent developments. Information is included on methodologies of mineral research and the chemistry of ions and complexes and on essentiality, requirements, transport, function, homeostasis, interrelationships, and toxicity of various mineral elements.]

616 Radioisotopes in Biological Research (also Veterinary Medicine 750) Spring. 4 credits. Prerequisites: courses in animal or plant physiology, or permission of instructor.
Lec, T R 11:15; lab, T 1:25–5. F. W. Lengemann.
Lectures and laboratories deal with the radioisotope as a tool in biological research. Among the topics considered are the utilization and detection of beta-emitting isotopes, gamma spectrometry, Cerenkov counting, neutron activation, autoradiography, and whole-body counting. Emphasis is placed on liquid-scintillation counting and double-label experiments and on C^{14} and H^3 as metabolic tracers. Experiments are designed to present basic principles, using plants and animals as subject material.

617 Applied Electrophysiology (also Veterinary Medicine 652) Fall. 2 credits. Open to seniors, graduate students, and second-, third-, and fourth-year veterinary students. Prerequisites: physics and 2 years of college biology; or permission of instructor.
Lec, W 8; lab, W 2–4:25. E. L. Gasteiger, E. R. Loew.
Theory and practice of electrophysiological techniques currently used for study of the nervous and muscular systems in normal and diseased states. Topics include electroencephalography, electromyography, electroretinography, and evoked potentials.

[618 Biological Membranes and Nutrient Transfer (also Veterinary Medicine 752) Spring. 2 credits. Prerequisites: courses in animal or plant physiology, quantitative and organic chemistry, and physics, and permission of instructor. Courses in cellular physiology and elementary physical chemistry are recommended. Offered alternate years. Not offered 1979–80.
Lec, T R 11:15. R. H. Wasserman.
An introduction to elementary biophysical properties of biological membranes; theoretical aspects of permeability and transport; and mechanism of transfer of inorganic and organic substances across intestine, placenta, kidney, erythrocytes, bacteria, and other biological systems.]

619 Lipids (also Nutritional Sciences 602) Fall. 2 credits. Prerequisite: Biological Sciences 330 or 331.
Lec, T R 11:15. A. Bensadoun.
Advanced course on biochemical, metabolic, and nutritional aspects of lipids. Emphasis on critical analysis of current topics in lipid methodology; lipid absorption; lipoprotein secretion, structure, and catabolism; mechanism of hormonal regulation of lipolysis and fatty acid synthesis; and cholesterol metabolism and atherosclerosis.

654 Mammalian Physiology, Lectures I Spring. 3 credits. Primarily for graduate students; written permission of instructor required for undergraduates. Enrollment limited. Prerequisite: Biological Sciences 311 or equivalent. May be taken before or after Biological Sciences 655.
Lec, M W F 8. K. W. Beyenbach.
Lecture topics include the cardiovascular system, the autonomic nervous system, respiration, kidney function, and acid-base balance.

[655 Mammalian Physiology, Lectures II Fall. 3 credits. Primarily for graduate students; written permission of instructor required for undergraduates. Enrollment limited. Prerequisite: Biological Sciences 311 or equivalent. May be taken before or after Biological Sciences 654. Not offered 1979–80.
Lec, M W F 8. 2 preliminary exams given at 7:30 p.m. Staff (coordinator: F. W. Lengemann).
Lecture topics include the somatic nervous and sensory systems, endocrinology, skeletal muscle, digestion and metabolism, growth, and lactation.]

656 Mammalian Physiology, Laboratory Spring. 3 credits. Primarily for graduate students and advanced undergraduates. Enrollment limited. Prerequisites: Biological Sciences 311 or equivalent and permission of instructor. Some experience in experimental methods and concurrent enrollment in Biological Sciences 654 strongly recommended.
Disc, M 2:30–4:25; lab, W 1:25–4:25. K. W. Beyenbach.
Advanced experimental methods dealing with the physiology of circulation, cardiac function, respiration, acid-base balance, endocrinology, nervous system, muscle, and digestion. The laboratory exercises are designed to illustrate basic physiological principles in mammals.

658 Molecular Mechanisms of Hormone Action (also Veterinary Medicine 758) Spring. 2 credits. Prerequisite: permission of instructor. Offered in alternate years.
Lec, T R 8. R. A. Corradino.
An advanced course developed from the current literature on endocrine mechanisms.

719 Graduate Research in Animal Physiology and Anatomy (also Veterinary Medicine 600) Fall or spring. Variable credit. S-U grades optional. Prerequisite: written permission of section chairperson and staff member who will supervise the work and assign the grade.

Hours to be arranged. Staff.
Similar to Biological Sciences 419 but intended for graduate students who are working with faculty members on an individual basis.

Related Courses in Other Departments

Advanced Work in Animal Parasitology (Veterinary Medicine 737)

Animal Reproduction and Development (Animal Science 220)

Cellular Neurobiology (Biological Sciences 496)

Developmental and Microscopic Anatomy (Veterinary Medicine 502)

Fundamentals of Endocrinology (Animal Science 427)

Insect Morphology (Entomology 322)

Introductory Parasitology and Symbiology (Veterinary Medicine 330)

Neuroanatomy (Veterinary Medicine 504)

Parasitic Helminthology (Veterinary Medicine 440)

Sensory Function (Biological Sciences 495)

Teaching Experience (Biological Sciences 403–404)

Vertebrate Developmental Anatomy (Biological Sciences 389)

Vision (Biological Sciences 395)

Neurobiology and Behavior

321 Neurobiology and Behavior Fall. 3 credits. Prerequisite: 1 year of introductory biology.
Lec, M W F 12:20. T. Eisner, J. M. Camhi, H. H. Zakon, and staff.
A general introduction to the field of neurobiology and behavior. Topics include evolution of behavior, cueing of behavior, animal orientation, social and nonsocial behavior, neuroanatomy, neurophysiology, neurochemistry, neural networks, and memory.

[322 Hormones and Behavior (also Psychology 322) Spring. 3 credits. Primarily for upperclass students; permission of instructor required for sophomores. Prerequisites: 1 year of introductory biology, and Biological Sciences 321 or a course in psychology. Not offered 1979–80.
Lec, T R 10:10–11:30. E. K. Adkins, R. E. Johnston.
The relationship between endocrine and neuroendocrine systems and the behavior of animals, including humans. Major emphasis is on sexual, parental, and aggressive behavior.]

324 Biopsychology Laboratory (also Psychology 324) Spring. 3 credits. S-U grades optional. Limited to 25 upperclass students. Prerequisites: laboratory experience in biology or psychology, Biological Sciences 321 or Psychology 123, and permission of instructor.
Lab, T R 1:25–4:25. Staff.
Experiments designed to provide research experience in animal behavior (including learning) and its neural and hormonal mechanisms. A variety of techniques, species, and behavior patterns are included.

395 Vision (also Engineering A&EP 611) Fall. 3 credits. Prerequisites: Chemistry 104 or 208; Mathematics 106, 111, or 113; and either Physics 102 or 208; or permission of instructor. Offered in alternate years.
Lec, M 1:25 and T R 10:10. R. K. Clayton.
A study of the mechanism of seeing that includes biological, physical, and chemical approaches to the subject.

420 Seminar in Neurobiology and Behavior Fall or spring. Variable credit. May be repeated for credit. S-U grades optional. Primarily for undergraduates.
Hours to be arranged. Organizational meetings first Monday of each semester at 8 p.m. in Caldwell 100. Staff.
In most semesters, at least two seminars on different topics are offered. Topics and instructors are listed in the division's catalog supplement issued at the beginning of the semester.

421 Comparative Vertebrate Ethology Fall. 3 credits. S-U grades optional. Prerequisites: 1 year of introductory biology for majors, Biological Sciences 321, and permission of instructor.
Lec, T R 9:05; lab to be arranged. Independent research project required. W. C. Dilger.
A survey of the methods and principles of vertebrate ethology, including such topics as aggression, fear, sex, feeding, and other normal activities. Emphasis is placed on the causation, function, biological significance, and evolution of species-typical behavior. The laboratories are designed to give firsthand knowledge of the material covered in lectures.

Also offered during the 3-week Summer Session. During the summer, field trips and field projects are substituted for many of the laboratories.

423 Animal Communication Fall. 4 credits. Limited to 32 students. Prerequisites: Biological Sciences 321 and either Physics 102 or 208.
Lec, T R 10:10; lab, T or R 1:25–4:25; other meetings to be arranged. R. R. Capranica, R. R. Hoy.
The functional aspects of biological signals, their physical properties, and the physiological mechanisms underlying their generation and reception. Lectures examine in detail selected biological communication problems from each of the known sensory modalities. Discussion covers signal analysis, transmission properties, and the limitation of each type of communication. Laboratories include behavioral observations under both field and captive conditions, and individual experience with the techniques of signal recording and analysis.

424 (425) Animal Social Behavior Spring. 4 credits. May be repeated for credit with permission of instructor. S-U grades optional. Prerequisite: Biological Sciences 321.
Lec, M W F 8. G. Hausfater.
This course examines animal social behavior and social organization in a phylogenetic perspective. A different taxonomic group serves as the focus of the course each year. In spring 1980 the course focuses on mammals, with later offerings tentatively scheduled to cover fishes, amphibians, reptiles, birds, and social insects.

427 Vertebrate Social Behavior Fall. 3 credits. Prerequisites: Biological Sciences 321 and 360 or their equivalents, and written permission of instructor. Offered in alternate years.
Lec, M W F 10:10; disc to be arranged. S. T. Emlen.
A discussion of vertebrate social behavior, with emphasis on behavioral adaptations to the environment; ecological significance of diverse social systems; advantages of territoriality, coloniality, and nomadism; evolution of cooperative and communal social organizations; feeding and flocking strategies; ecological constraints on monogamous, polygamous, and promiscuous mating systems; and the role of social behavior in population regulation.

429 Undergraduate Research in Neurobiology and Behavior Fall or spring. Variable credit. S-U grades optional. Undergraduates must attach to their course registration material written permission from the staff member who will supervise the work and assign the grade.
Hours to be arranged. Staff.
Practice in planning, conducting, and reporting independent laboratory and library research programs.

No more than 4 credits of research may be used in completion of the neurobiology and behavior concentration requirements.

491 Principles of Neurobiology, Laboratory (also Psychology 491) Fall. 4 credits. Limited to 36 students. Prerequisite: Biological Sciences 495 or 496 or written permission of instructor.
Lab, M W or T R 12:20–4:25. B. R. Land and staff.
Laboratory practice with neurobiological preparations and experiments, designed to teach the students the techniques, experimental designs, and research strategies used to study biophysical and biochemical properties of excitable membranes, sensory receptors, and the central nervous system transformation of afferent activity as well as the characteristic composition and metabolism of neural tissue. Theoretical content will be at the level of Junge's *Nerve and Muscle Excitation*.

[494 Neuropharmacology Spring. 3 credits. Prerequisites: Biological Sciences 321 and either 330 or 331; or written permission of instructor. Not offered 1979–80.
Lec, M W F 8.
Deals with drugs that affect the nervous system, both central and peripheral. Emphasis is on mechanisms of drug action whereby basic biochemical processes and neurophysiological and behavioral phenomena are bridged. Stimulants, anesthetics, hallucinogens, and neurotoxins are discussed, as well as drug addiction, psychopharmacology, endocrine pharmacology, and the biochemical basis of the therapeutic uses of drugs in diseases of the nervous system.]

[495 Sensory Function (also Psychology 495) Fall. 3 credits. Prerequisites: Biological Sciences 321 or equivalent; and either Biological Sciences 496, 692, 696, Psychology 422, or 425, or written permission of instructor. Offered in alternate years. Not offered 1979–80.
Lec, T R 9:05. B. P. Halpern.
An examination of the basic principles of sensory function, with emphasis on processes at the receptor level. Filtering, transduction, and the pattern of the initial neural response are studied. One sensory system is followed, from environmental energy patterns through central nervous system responses, and serves as a general model. The course uses the Socratic method, in which the instructor asks questions of the students. Students should bring a recent photograph of themselves to the first class.]

496 Cellular Neurobiology Spring. 4 credits. Prerequisite: Biological Sciences 321.
Lec, M W F 10:10; disc to be arranged. 2 preliminary exams given at 7:30 p.m. J. M. Camhi, R. B. Campenot, M. M. Salpeter.
A one-semester, intensive undergraduate course in neurobiology. The course provides in-depth, current treatment of the basic principles of cellular, chemical, pharmacological, molecular, anatomical, and integrative aspects of neurobiology.

[497 Neurochemistry Fall. 3 credits. Prerequisites: Biological Sciences 321 and either 330 or 331. Not offered 1979–80.
Lec and disc, M W F 9:05.
Special features of the composition and metabolism of neural tissue are discussed. The identification of synaptic transmitters in the nervous system, including their specific localization, biosynthesis and metabolism, release, inactivation, and action on postsynaptic receptors, is considered in detail.]

623 (622) Chemical Communication (also Chemistry 622) Fall. 3 credits. Primarily for research-oriented students. Limited to 30 senior and graduate students. Prerequisites: 1 year of introductory biology for majors or equivalent, course work in biochemistry, and Chemistry 358 or equivalent. Offered in alternate years.
Lec, M W F 1:25, T. Eisner, J. Meinwald, W. L. Roelofs, and guest speakers.
The production, transmission, and reception of chemical signals in communicative interactions of animals, plants, and microorganisms. Studies of insects are emphasized. Specific topics are treated, with varying emphasis on chemical, biochemical, neurobiological, ecological, and evolutionary principles.

[624 Behavioral Neurogenetics Spring. 3 credits. S-U grades optional. Primarily for research-oriented students. Prerequisites: Biological Sciences 321 and 281. Course work in developmental biology recommended. Offered in alternate years. Not offered 1979–80.
Lec, T R 9:05; disc and demonstration to be arranged. R. R. Hoy.
The study of the neurogenetic basis of behavior in animals, using "simple" behaviors that can be analyzed genetically and neurobiologically. Both vertebrate and invertebrate animals are discussed, although emphasis is on the invertebrates. Lectures and assigned readings draw heavily from journal articles.]

627 Quantitative Approaches to Animal Behavior Fall. 3 credits. S-U grades optional, with consent of instructor. Primarily for graduate students; written permission of instructor required for undergraduates. Enrollment limited. Prerequisite: Biological Sciences 321 or equivalent. Offered in alternate years.
Lec and disc, T R 10:10–11:30. G. Hausfater.
This course emphasizes a quantitative approach to research on animal behavior. Lectures, discussions, and readings focus on the formulation of precise, testable hypotheses for behavior research, especially mathematical models, and on the use of systematic sampling techniques in observational research. Basic probability distributions are introduced and used in the analysis of behavior sequences and interaction patterns. Stochastic models of behavior are also discussed.

628 Field Methods in Animal Behavior Spring. 4 credits. Limited to 20 students. Prerequisites: Biological Sciences 321 and either 421 or 427, or their equivalents, and written permission of instructor.
Lec and disc, T R 10:10; lab, T 1:25–4:25. Independent project required. Enrolled students must participate in all aspects of course; no partial credit given. Staff.
A practically oriented course for seniors and first-year graduate students who will be pursuing field studies. Lecture-discussion areas include the scope and design of field behavior projects, sources of variability, and evaluation of relevant publications. Laboratory periods are devoted to introduction, demonstration, and practice of techniques and to individual fieldwork.

691 Developmental Neurobiology Fall. 2 credits. S-U grades optional, with consent of instructor. Prerequisite: Biological Sciences 496 or permission of instructor.
Lec and disc, 2 hours each week, to be arranged. R. B. Campenot.
The embryologic development of the nervous system is considered in the light of both historical and current research. Emphasis is on cellular issues, i.e., How do nerve cells differentiate both morphologically and biochemically, and how do they interact to produce a properly wired nervous system?

692 Behavioral Neurophysiology, Lectures Fall. 3 credits. Prerequisite: Biological Sciences 496 or permission of instructor. Offered in alternate years.
Lec, M 9:05; disc, 2 hours each week, to be arranged. J. M. Camhi.
The course treats those aspects of the organization of the nervous system that are important in determining the forms of behavior observed. Some special emphasis is given to the nervous system of invertebrates, which serve as models for the more complex organization of vertebrates. Some material is treated from a neuroethological perspective. Readings are original papers in the field.

694 Behavioral Neurophysiology, Laboratory Fall. 2 credits. Limited to 10 students. Prerequisite: concurrent enrollment in Biological Sciences 692. Offered in alternate years.
Lab to be arranged. J. M. Camhi.
After learning basic techniques, students work on extended research projects under the direction of J. M. Camhi and the staff of Biological Sciences 491.

695 Physiological Optics Fall. 3 credits. Limited to 24 students. Courses in elementary biology or psychology, and physics recommended, and courses appropriate to particular track (see below). Offered in alternate years.
Lec, T R 9:05; lab, 3 hours each week, to be arranged. H. C. Howland.
The course is primarily for upperclass students who intend to pursue research or conduct clinical work in vision. Topics include geometrical optics, clinical refraction, measurement of MTF and contrast sensitivity, and the vegetative physiology of the eye relevant to optical quality of the optical image.

Laboratory work is divided into three tracks: (1) *Clinical Track* for students intending to work in optometry or medicine; (2) *Psychophysical Track* for students intending to conduct research in human or animal vision; and (3) *Engineering Track* for students intending to use or design optical devices for which the human eye is a component in the system.

Grades are based on the student's accomplishments within the chosen track, in view of the background brought to it.

696 Bioelectric Systems (also Electrical Engineering 620) Spring. 3 or 4 credits (4 credits with lab). Prerequisite: either Biological Sciences 423 or 496 or Electrical Engineering 301; written permission of instructor required for lab.
Lec, M W 9:05; disc and demonstration, R 2–4:25; lab to be arranged. R. R. Capranica, M. Kim.
Application of electrical systems techniques to biological problems. Electrical activity of nerve cells; generation and propagation of nerve impulse; voltage clamp technique and its phase-plane analysis; neuromuscular systems; synaptic transmission; models of nerve cells, sensory receptors, and encoding in the nervous system; analysis of electrophysiological data and electrodes and instrumentation techniques.

720 Seminar in Advanced Topics in Neurobiology and Behavior Fall or spring. Variable credit. May be repeated for credit. S-U grades only. Primarily for graduate students; written permission of instructor required for undergraduates.
Hours to be arranged. Staff and students.
Designed to provide several study groups each semester on specialized topics. A group may meet for whatever period is judged adequate to enable coverage of the selected topics. Ordinarily, topics will be selected and circulated during the preceding semester. Suggestions for topics should be submitted by faculty or students to the chairperson of the Section of Neurobiology and Behavior.

723 Graduate Seminar in Vertebrate Social Behavior Fall. 2 credits. May be repeated for credit. S-U grades only. Enrollment limited. Prerequisites: Biological Sciences 321, 360, and 477, or their equivalents, and written permission of instructor.
Hours to be arranged. S. T. Emlen, G. Hausfater.
Intended as a graduate-level follow-up to Biological Sciences 427. An advanced, participation-format seminar dealing with various aspects of the evolution of social organization in vertebrates.

Related Courses in Other Departments

Mammalian Neurophysiology (Biological Sciences 610)

Teaching Experience (Biological Sciences 403–404)

Biochemistry and Cell Biology

132 Orientation Lectures in Biochemistry Spring. Noncredit. S-U grades only (registered students receive an unsatisfactory grade for nonattendance). Primarily for freshmen, sophomores, and transfer students.
Lec, Saturday 10:10–11:30; first 3 Saturdays of semester. Section chairperson and staff.
Lectures illustrate modern research and training in biochemistry and molecular and cell biology.

231 Some Applications of Biochemistry to Medicine and Agriculture Fall. 3 credits. S-U grades optional. Intended for students who have not previously studied biochemistry and who do not expect to pursue it further. Not recommended for students who have taken organic chemistry. Prerequisite: Chemistry 104 or 208 or equivalent.
Lec, M W F 12:20. R. A. Calvo and staff.
An attempt is made to cover much of the material presented in a standard one-semester survey course. However, the focus is on topics of general interest, such as nutrition, cancer, hormones, genetic diseases, and viruses.

330–331 Principles of Biochemistry
Introductory biochemistry is offered in two formats, individualized instruction (330) and lectures (331). *Individualized instruction is offered to a maximum of 150 students each semester. Lectures given fall semester only.*

330 Principles of Biochemistry, Individualized Instruction Fall or spring. 4 credits. Prerequisite: Chemistry 253 or equivalent.
Disc, M W F 8 or 10:10; additional hours to be arranged. No formal lecs. Fall: M. Ferger, G. P. Hess, and staff; spring: M. Ferger, J. M. Calvo, and staff.
The focal point for this course is a study center – open mornings, afternoons, and some evenings – where students find materials, get help, participate in discussions, and take exams. Students are required to master a minimum body of core material. The pace at which this material is assimilated is largely self-determined. Students who want to go beyond core material have available a wide range of electives, including discussions of research papers and independent study of a variety of problems and *Scientific American* articles. Grades are determined primarily by the amount of elective work satisfactorily completed and by a final exam.

331 Principles of Biochemistry, Lectures Fall; also offered during summer session. 4 credits. Prerequisite: Chemistry 253 or equivalent.
Lec, M W F S 10:10. B. K. Tye, J. K. Moffat, R. Barker.
Chemistry of biological substances, presented in a lecture format. Course content is similar to that of Biological Sciences 330.

430 Basic Biochemical Methods Fall or spring. 4 credits. Prerequisites: Biological Sciences 330 or 331, a lab course in organic chemistry, and permission of instructor.
Lec and disc, F 1:25; lab, M W or T R 12:20–4:25. R. R. Alexander, R. M. Crump, N. B. Wurster.
A modular course designed to introduce the student to the biochemical techniques most commonly used in various biological fields. Students select two

of the following modules: clinical and nutritional biochemistry, lipids, isolation and characterization of cell components, or nucleic acids. An enzymology module is taken by all students.

432 Survey of Cell Biology Spring. 3 credits. Prerequisite: Biological Sciences 330 or 331 or equivalent.
Lec, M W F 11:15. J. T. Lis.
A survey of material covered in depth in Biological Sciences 433, 438, and 483. The course covers a wide array of topics, including techniques used in the study of cellular structure, membrane activities, cell junctions, organelles, cell movement, cell division, chromosome structure and the control of gene expression, and cellular differentiation.

433 Cell Structure and Physiology Fall. 2 credits. Prerequisite: Biological Sciences 330 or 331 or permission of instructor.
Lec, T R 12:20. R. E. MacDonald.
The functional aspects of cells and their organelles: bioenergetics, transport, movement, growth, nutrition, and structure are examined in detail in free-living cells, differentiated cells, and highly specialized cells. The course attempts to integrate current knowledge about cell biochemistry, structure, and function with the role of the cell in its environment and in its interrelationship with other cells.

434 Laboratory in Cell Biology Spring. 4 credits. Enrollment limited. Prerequisite: written permission of instructor.
Lab, M W 1:25–4:25 or R 9:05–4:25; disc to be arranged. J. Gibson, R. E. McCarty.
The course provides experience in experimental design and stresses techniques for handling and experimenting with cells of different kinds.

435–436 Undergraduate Biochemistry Seminar 435, fall; 436, spring. 1 credit each term. May be repeated for credit. S-U grades optional, with consent of instructor. Enrollment limited, upperclass students only. Prerequisite: Biological Sciences 330 or 331 or written permission of instructor.
Hours to be arranged. Organizational meeting first Tuesday of each semester at 4 p.m. Fall: L. A. Heppel; spring: J. W. Roberts.
A group of selected papers from the literature will be critically evaluated during six or seven two-hour meetings. Fall: topics in nucleic acids biosynthesis; spring: topics in genetic regulation.

438 Cell Proliferation and Oncogenic Viruses Spring. 2 credits. Prerequisite: Biological Sciences 330 or 331. Biological Sciences 281 recommended.
Lec, T R 12:20. V. M. Vogt.
A description of the growth properties of animal cells in culture, followed by discussions of the changes in cells that are induced by tumor viruses and carcinogens. Topics include macromolecular growth factors, contact inhibition, cell surface properties, cell cytoskeleton, transcription and translation of viral and host genes, and integration of viral DNA into host chromosomes.

439 Undergraduate Research in Biochemistry Fall or spring. Variable credit. Primarily for undergraduates concentrating in biochemistry. Prerequisite: adequate ability and training for the work proposed. Undergraduates must attach to their course registration material written permission from the staff member who will supervise the work and assign the grade.
Hours to be arranged. Staff.
Special work, arranged jointly by the section chairperson and the research adviser, in any branch of biochemistry on problems under investigation by section staff members.

Research credits may not be used in completion of the biochemistry concentration requirements.

631 Protein Structure and Function Fall. 2 credits. S-U grades optional, with permission of instructor. Prerequisites: Biological Sciences 330 or 331, Chemistry 288, and either Chemistry 358 or 360; or written permission of instructor.
Lec, M W 9:05. G. W. Feigenson, Q. H. Gibson and staff.
Lectures on protein structure and the nature of enzymatic catalysis.

632 Bioenergetics and Membranes Spring. 3 credits. Prerequisites: Biological Sciences 330 or 331, and either Chemistry 358 or 360; or written permission of instructor. Physical chemistry recommended.
Lec, M W F 9:05. P. C. Hinkle and staff.
Oxidative phosphorylation, photophosphorylation, active transport, muscle contraction, and the structure of biological membranes.

633 Biosynthesis of Macromolecules Fall. 2 credits. Prerequisites: Biological Sciences 330 or 331, and either Chemistry 358 or 360; or written permission of instructor.
Lec, T R 9:05. J. W. Roberts, D. B. Wilson.
DNA, RNA, and protein synthesis; regulation of gene expression; and other topics.

634 Biochemistry of the Vitamins and Coenzymes (also Nutritional Sciences 634) Spring. 2 credits. Prerequisites: Biological Sciences 330 or 331 or equivalent, and either Chemistry 358 or 360. Offered in alternate years.
Lec, T R 10:10. M. N. Kazarinoff.
The chemical, biochemical, and nutritional aspects of the vitamins and coenzymes.

635 Enzymology and Metabolic Regulation (also Nutritional Sciences 635) Spring. 2 credits. Prerequisites: Biological Sciences 330 or 331, and either Chemistry 358 or 360; or written permission of instructor. Physical chemistry recommended.
Lec, T R 9:05. W. L. Dills and staff.
The study of enzymes and the molecular mechanisms of metabolic regulation.

638 Intermediate Biochemical Methods Spring. 4 credits. Primarily for undergraduates majoring in biochemistry and for graduate students with a minor in biochemistry. Prerequisites: Biological Sciences 330 or 331, and permission of instructor. Students must obtain permission of the instructor by the last day of the course enrollment period.
Lab, T or R 9:05–4:25. E. B. Keller, L. A. Heppel, and staff.
Selected experiments on proteins, DNA, and bioenergetics (cellular particulates, kinetics, and general enzymology) illustrate basic biochemical principles. The course emphasizes quantitative aspects rather than qualitative identifications.

732–739 (732–738) Current Topics in Biochemistry Fall or spring. ½ or 1 credit for each topic. May be repeated for credit. (Students registering for ½ credit should *not* fill in the credit hour column on the optical mark registration form; the computer will be programmed to automatically register students for ½ credit.) S-U grades only. Prerequisite: Biological Sciences 330 or 331 or equivalent.
Lectures and seminars on specialized topics.

Fall 1979: 4 topics are offered.

733 Sulfur Metabolism in Plants 1 credit (12 lecs).
T R 12:20; Sept. 4–Oct. 11. J. T. Madison, J. F. Thompson.

735 Structure and Function of Microtubules ½ credit (6 lecs).
W F 12:20; Sept. 5–21. S. J. Edelstein.

737 RNA Tumor Viruses: Replication and Transformation ½ credit (6 lecs).
T R 12:20; Oct. 16–Nov. 6. V. M. Vogt.

739 Prostaglandins and Immune Function ½ credit (6 lecs).
T R 12:20; Nov. 13–Dec. 6. V. Utermohlen.

Spring 1980: 4 topics are offered.

732 Biology, Genetics, and Development of *Drosophila* ½ credit (6 lecs).
T R 12:20; Jan. 22–Feb. 7. J. T. Lis.

734 Mechanisms of Ligand Binding by Hemoglobin ½ credit (6 lecs).
T R 12:20; Feb. 12–28. Q. H. Gibson.

736 Transport and Other Membrane Properties of Normal and Malignant Cells ½ credit (6 lecs).
T R 12:20; Mar. 4–27. L. A. Heppel.

738 Membrane Transport Mechanisms ½ credit (6 lecs).
T R 12:20; Apr. 1–17. R. E. MacDonald.

830 Biochemistry Seminar Fall or spring. Noncredit.
F 4:15. Staff.
Lectures on current research in biochemistry, presented by distinguished visitors and staff.

831 Advanced Biochemical Methods I Fall. 6 credits. Limited to graduate students majoring in biochemistry.
Lab and disc, 12 hours each week, to be arranged. Organizational meeting first Tuesday of semester at 10:10. D. B. Wilson and staff.
To learn the basic techniques of biochemical research, each student carries out a research project.

832 Advanced Biochemical Methods II Spring. 6 credits. S-U grades only. Limited to graduate students majoring in biochemistry.
Hours to be arranged. Staff (coordinator: D. B. Wilson).
Research in the laboratories of three different professors chosen by the student. Arrangements are made jointly between the field representative and the research adviser.

833 Research Seminar in Biochemistry Fall and spring. 1 credit each term. (Students must register for 2 credits each term, since an "R" grade is given at the end of the fall term.) May be repeated for credit. S-U grades only. Required of all graduate students (first-year students excepted) majoring in biochemistry.
M 7:30–9 p.m. E. Racker.

Related Courses in Other Departments

Lipids (Biological Sciences 619)

Molecular Aspects of Development (Biological Sciences 483)

Molecular Mechanisms of Hormone Action (Biological Sciences 658)

Plant Biochemistry (Biological Sciences 648)

Teaching Experience (Biological Sciences 403–404)

Vertebrate Biochemistry (Veterinary Medicine 525)

Botany

241 Plant Biology Fall. 3 credits. Enrollment may be limited, with preference given to sophomores and juniors majoring in agronomy, botany, environmental education, floriculture, horticulture, natural resources, plant sciences, vegetable crops, and wildlife. Prerequisite: 1 year of introductory biology for majors or equivalent.

Lec, T R 9:05; lab, M T W R or F 1:25–4:25, or M or W 7:30–10:30 p.m. K. J. Niklas.
Introductory botany for those who plan to specialize in or use some aspect of the plant sciences. Emphasizes structure, reproduction, and classification of angiosperms and the history of life on earth. Laboratory emphasizes development of skills in handling plant materials, including identification. First, second, and fourth weeks of laboratory are field trips, starting with the first day of classes. *Those who register for an evening laboratory are still required to attend the afternoon field trips.*

242 Plant Physiology, Lectures Spring. 3 credits. Primarily for undergraduates in agricultural sciences. Prerequisites: 1 year of introductory biology and introductory chemistry; concurrent enrollment in Biological Sciences 244 or written permission of instructor required for undergraduates.
Lec, M W F 10:10. P. J. Davies.
Plant physiology as applied to plants growing in communities. Examples deal with crop plants or higher plants where possible, though not exclusively. Topics include cell structure and function; plant metabolism, including photosynthesis; soil-plant-water relations; water uptake, transport, and transpiration; irrigation of crops; sugar transport; mineral nutrition of crops; respiration and photosynthesis; light relations in crops; growth and development—hormones, flowering, fruiting, dormancy, and abscission; and chemical control of plant growth.

244 Plant Physiology, Laboratory Spring. 2 credits. Prerequisite: concurrent enrollment in Biological Sciences 242.
Lab, M T W or R 1:25–4:25; disc, M T W or R 12:20. Lab and disc must be on same day. C. Reiss.

246 Plants and Human Affairs Spring. 3 credits. S-U grades optional. Intended for students in all colleges.
Lec and disc, M W F 8. D. M. Bates.
A consideration of the role of plants in the human environment and in the evolution of civilizations. Emphasis is on ethnobotanical considerations and on historical to present-day utilization of plants in nutrition, housing, clothing, medicine, religion, and the arts.

248 Taxonomy of Cultivated Plants (also Floriculture and Ornamental Horticulture 248) Spring. 4 credits. Limited to 28 students. Prerequisite: 1 year of introductory biology or written permission of instructor. May not be taken for credit after Biological Sciences 346.
Lec, M W 10:10; lab, M W 2–4:25. J. W. Ingram.
A study of ferns and seed plants, their relationships, and their classification into families and genera, emphasizing cultivated plants. Particular emphasis is placed on gaining proficiency in identifying and distinguishing families and in preparing and using analytical keys. Attention is also given to the economic importance of taxa, to the basic taxonomic literature, and to the elements of nomenclature.

[341 Plant Physiology, Lectures Fall. 3 credits. Prerequisites: 1 year of introductory biology, organic chemistry, and either concurrent enrollment in Biological Sciences 349 or written permission of instructor. Not offered 1979–80.
Lec, T R 10:10 and M 7:30 p.m. A. T. Jagendorf.
The behavior, growth, transport processes, and environmental response of plants. Topics include membrane properties, solute and water transport, and function of osmotic forces; mineral and organic nutrition; stress resistance; growth and hormonal action; metabolism, including photosynthesis and respiration; and responses to gravity, light, photoperiod, and temperature.]

343 Field Phycology Summer. 4 credits. S-U grades optional. Prerequisite: Biological Sciences 364 or general familiarity with marine algae. A special 3-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details and application, consult the SML office, Stimson G14. Estimated cost: $620.
Daily lecs, labs, and fieldwork for 3 weeks. SML faculty.
An overview of the major marine algal groups, including aspects of anatomy, morphology, development, life histories, physiology, and utilization. Laboratories and fieldwork emphasize relationships between distribution and major environmental parameters and involve student projects.

345 Plant Anatomy Fall. 4 credits. Limited to 48 students. Prerequisite: 1 year of introductory biology or a semester of botany. Not intended for general education. Students in doubt about their level of preparedness or the role of this course in their curricula are encouraged to consult the instructor before registering.
Lec, T R 8; lab, M W 2–4:25 or T R 10:10–12:35. D. J. Paolillo.
A descriptive course with equal emphasis on development and mature structure. Lecture, laboratory, and reading are integrated in a study guide. The laboratory offers the opportunity to develop the practical skills required to make anatomical diagnoses and to write anatomical descriptions.

346 Taxonomy of Vascular Plants Fall. 4 credits. Prerequisites: introductory biology and written permission of instructor. May not be taken for credit after Biological Sciences 248.
Lec and disc, T R 9:05; lab, T R 2–4:25.
M. D. Whalen.
An introduction to the classification of ferns and flowering plants, with attention to principles, methods of identification, and literature. Field trips are held during laboratory periods in the first half of the term.

347 Cytology Fall. 4 credits. Prerequisite: 1 year of introductory biology for majors. Biological Sciences 281 recommended.
Lec, M W 9:05; lab, M W or T R 10:10–12:35.
C. H. Uhl.
A study primarily of the structure of cells and their components, and the relation of these to function and heredity. Special attention is given to chromosomes. Both plant and animal materials are used.

[348 Phycology Spring. 4 credits. Not offered 1979–80.
Lec, M W F 10:10; lab, M W or F 2–4:25.
J. M. Kingsbury.
An introduction to freshwater and marine algae, including consideration of their ecology as members of the plankton and benthos and their importance to man. The laboratory uses field material and cultures from an extensive living collection to illustrate lecture topics, provide familiarity with algae in the field, and introduce the student to techniques used in isolating, culturing, and studying algae in the laboratory.]

[349 Plant Physiology, Laboratory Fall. 2 credits. Prerequisite: concurrent enrollment in Biological Sciences 341. Not offered 1979–80.
Lab, T W or R 1:25–4:25; disc, T W or R 12:20. Lab and disc must be on same day. C. Reiss.]

442 Taxonomy and Evolution of Vascular Plants Spring. 4 credits. Prerequisites: Biological Sciences 248 or 346, and written permission of instructor.
Lec and disc, T R 9:05; lab, T R 2–4:25.
M. D. Whalen.
An interdisciplinary view of broad-scale and species-level evolution in vascular plants, with consideration of morphological, ecological, biogeographic, cytogenetic, and biochemical aspects.

[444 Comparative and Developmental Morphology of the Embryophyta Spring. 4 credits. Prerequisite: Biological Sciences 345. Offered in alternate years. Not offered 1979–80.
Lec, T R 8; lab, T R 2–4:25. D. J. Paolillo.
The life histories of bryophytes, vascular cryptogams, and seed plants are examined for their developmental attributes and for their bearing on concepts of evolution and group relationships. The course content is designed to develop an awareness of the integration between morphology and other disciplines in biology.]

[445 Photosynthesis (also Engineering A&EP 601) Fall. 3 credits. Prerequisites: Chemistry 104 or 208; Mathematics 106, 111, or 113; and either Physics 102 or 208; or permission of instructor. Offered in alternate years. Not offered 1979–80.
Lec, M 1:25 and T R 10:10. R. K. Clayton.
A detailed study of the process by which plants use light in order to grow; physical and physicochemical aspects of the problem are emphasized.]

446 Cytogenetics Spring. 3 credits. Prerequisites: Biological Sciences 281 and 347 or their equivalents. Offered in alternate years.
Lec, M W 9:05; lab, M or W 10:10–12:35.
C. H. Uhl.
Deals mainly with the cellular mechanisms of heredity, including recent research in cytology, cytogenetics, and cytotaxonomy.

448 Plants and Time (Paleobotany) Spring. 4 credits. Prerequisites: Biological Sciences 345 and 444 (may be taken concurrently), or written permission of instructor. Offered in alternate years.
Lec and disc, M F 11:15; lab, W 1:25–4:25; additional hours to be arranged for research project. K. J. Niklas.
A survey of the evolutionary history of the major groups of plants from the Precambrian to the Tertiary. Emphasis on the geologic occurrence of major reproductive-vegetative innovations in the plant kingdom, the subsequent adaptive radiations of various lineages, and the evolutionary mechanisms assumed responsible.

449 Undergraduate Research in Botany Fall or spring. Variable credit. Undergraduates must attach to their course registration material written permission from the staff member who will supervise the work and assign the grade.
Hours to be arranged. Staff.
Students who want to work on special problems or studies in botany may register in this course. They must satisfy the instructor under whom the work is to be taken that their preparation warrants the choice of problem.

Research credits may not be used in completion of the botany concentration requirements.

640 Special Topics in Plant Taxonomy Fall or spring. 1 credit for each topic. S-U grades optional. Prerequisite: written permission of instructor.
Lec and disc to be arranged. H. E. Moore, J. W. Ingram, W. J. Dress.
A series of topics designed to provide professional background in families of tropical phanerogams, literature of taxonomic botany, and nomenclature.
(1) Fall. *Families of Tropical Phanerogams.* The families of flowering plants encountered solely or chiefly in tropical regions are considered in lectures, discussions, and demonstrations, with the aim of providing basic points of recognition for, and an understanding of, diversity and relationships in these families for the student venturing into the tropics. Organizational meeting first Friday of semester at 11:15. Offered in alternate years. H. E. Moore.
(2) Fall. *Literature of Taxonomic Botany.* A survey of the basic reference works in taxonomy from the pre-Linnaean literature drawn on by Linnaeus to contemporary publications, with comments on the peculiarities of the books (when appropriate), on publication dates, typographic devices, and intricacies of bibliographic citation. Lectures, discussions, demonstrations, and problems. Offered in alternate years. J. W. Ingram.

(3) Spring. *Nomenclature.* An analysis of the International Code of Botanical Nomenclature and its application to various plant groups. Lectures, discussions, and problems. May be taken concurrently with Biological Sciences 652 (641). Offered in alternate years. W. J. Dress.

[642 Topics in Ultrastructure of Plant Cells Spring. 3 credits. Primarily for graduate students, although upperclass students with adequate background are allowed to enroll. No auditors. Prerequisites: Biological Sciences 345 or 347, and written permission of course coordinator. Offered in alternate years. Not offered 1979–80.

Lec, M W F 10:10; optional disc, F 1:25 or to be arranged. Staff (coordinator: M. V. Parthasarathy).

An advanced course dealing with organelles in depth, and in breadth where necessary. Topics include salient ultrastructural features of some plant groups and certain specialized cells and processes. Content of the course and staff direction vary to some extent from year to year.]

643 Plant Physiology, Advanced Laboratory Techniques Fall. 4 credits. S-U grades only. Primarily for graduate students doing work in plant physiology, but open to others if space permits. Prerequisites: organic chemistry, biochemistry, and a course in plant physiology.

Lab, T or W 8–5; disc, M 4:30–5:30. C. Reiss and staff.

An introduction to some modern methods in experimental plant biology.

644 Plant Growth and Development Spring. 3 credits. Prerequisites: Biological Sciences 345 and either 242 or 341, or their equivalents, or written permission of instructor. Offered in alternate years.

Lec, M W F 9:05. P. J. Davies, D. J. Paolillo.

Explores the changes that occur during plant growth and development and their control: morphological and anatomical changes in apices, tissue differentiation, organ formation, embryo development, gene regulation, hormone action and interaction, the influence of light in development, flowering, fruiting, dormancy, abscission, and senescence.

646 Families of Tropical Flowering Plants: Field Laboratory Intersession. 3 credits. S-U grades only. Limited to 20 students, with preference given to seniors and graduate students from member institutions of the Organization for Tropical Studies. Prerequisite: Biological Sciences 248 or 346 or equivalent. Biological Sciences 640(1) recommended. For more details and application, consult H. E. Moore, Jr., L. H. Bailey Hortorium, 467 Mann Library. Estimated cost of tuition plus room and board (exclusive of transportation): $800. Offered in alternate years.

H. E. Moore.

An intensive orientation to families of tropical flowering plants represented in forests of the American tropics. Emphasis on field identification combined with laboratory analysis of available materials in a "whole-biology" context.

647 Seminar in Systematic Botany Spring. 1 credit. May be repeated for credit. S-U grades optional. Prerequisite: written permission of course coordinator required for undergraduates.

Lec and disc to be arranged; organizational meeting first Friday of semester at 1:25. Staff (coordinator: D. M. Bates).

Lectures and discussions led by staff, visitors, and students on topics of current importance to systematic botany.

[648 Plant Biochemistry Spring. 3 credits. Prerequisites: organic chemistry, biochemistry, and a course in plant physiology. Offered in alternate years. Not offered 1979–80.

Lec, M W F 9:05. A. T. Jagendorf, R. E. McCarty, J. F. Thompson.

Selected areas of plant biochemistry are reviewed in the context of the plant life cycle and responses to the environment. Topics include metabolism of lipids, carbohydrates, organic acids, proteins, and pigments; nitrogen and sulfur assimilation; hormone metabolism; respiration; photosynthesis; development and replication of chloroplasts; and cell wall composition and properties. Attention is paid to operation of control mechanisms.]

[649 Transport of Solutes and Water in Plants Fall. 3 credits. Prerequisite: Biological Sciences 341 or equivalent. Offered alternate years. Not offered 1979–80.

Lec, M W F 10:10. R. M. Spanswick.

Transport of ions, water, and organic materials in plants; mechanisms of ion transport; relationships between ion transport and metabolism; ion uptake and transport in higher plants; phloem transport; and water relations of single cells and whole plants.]

651 Quantitative Whole-Plant Physiology Fall. 3 credits. S-U grades only. Prerequisites: introductory physics, calculus, and plant physiology. Offered alternate years.

Lec, T R 10:10–11:30. R. M. Spanswick.

An exploration of the extent to which physiological processes and their interactions can be formulated in a quantitative manner and integrated to describe various aspects of plant behavior, including growth and yield. Consideration is given to characterization of the plant environment, energy balance, gas exchange, water relations, photosynthesis, respiration, translocation, nutrient supply, and the timing of developmental events.

652 (641) Botanical Latin Spring. 1 credit. S-U grades optional. Prerequisite: written permission of instructor. Offered in alternate years.

Lec and disc to be arranged. W. J. Dress.

Basic grammar and vocabulary and exercises in writing and reading the Latin of plant taxonomy, as well as applications to botanical nomenclature.

740 Plant Physiology Seminar Fall and spring. Noncredit (no official registration). Required of graduate students doing work in plant physiology.

F 11:15. Staff.

Lectures on current research in plant physiology, presented by visitors and staff.

749 Graduate Research in Botany Fall or spring. Variable credit. May be repeated for credit. S-U grades optional.

Hours to be arranged. Staff.

Similar to Biological Sciences 449 but intended for graduate students who are working with faculty members on an individual basis.

840 Current Topics in Plant Physiology Fall or spring. 2 credits. May be repeated for credit. S-U grades only.

Hours to be arranged. Staff.

Seminar reports by graduate students on current literature in experimental plant physiology or related areas.

Related Courses in Other Departments

Advanced Mycology (Plant Pathology 579)

Current Topics in Mycology (Plant Pathology 649)

Introductory Mycology (Plant Pathology 309)

Plant Ecology (Biological Sciences 463, 465)

Plant Ecology Seminar (Biological Sciences 669)

Taxonomy of Fungi (Plant Pathology 599)

Teaching Experience (Biological Sciences 403–404)

Ecology, Systematics, and Evolution

260 Introductory Ecology Fall or spring. 3 credits. Prerequisite: 1 year of introductory biology or written permission of instructor.

Lec, T R 11:15; disc, T or R 1:25, 2:30, or 3:35. Fall: C. A. S. Hall; spring: P. F. Brussard.

An introduction to biological phenomena that occur at the population, community, and ecosystem levels of organization. The relevance of ecological principles to current environmental problems is examined. C. A. S. Hall will spend proportionately more time on energy-related issues.

274 The Vertebrates Spring. 5 credits. Primarily for sophomores; this course is a prerequisite for many advanced courses in vertebrate biology, anatomy, and physiology. Each lab section limited to 21 students. Prerequisite: 1 year of introductory biology for majors. Fee: $10.

Lec, T R 10:10; lab, M W 1:25–5, M W 7–10 p.m., or T R 1:25–5. 1 midterm exam given at 7:30 p.m. Staff.

An introduction to the evolution, classification, comparative anatomy, life history, and behavior of vertebrate animals. Laboratory dissection and demonstration are concerned with structure, classification, systematics, biology of species, and studies of selected aspects of vertebrate life.

360 General Ecology Fall or spring. 3 credits. For students concentrating in ecology or a related subject. Not open to freshmen in fall semester. Prerequisite: 1 year of introductory biology for majors.

Lec, T R 9:05; disc, W or R 1:25, 2:30, or 3:35. Fall: P. L. Marks, P. P. Feeny; spring: R. B. Root, B. F. Chabot.

Principles concerning the interactions between organisms and their environment; influence of competition, predation, and other factors on population size and dispersion; analysis of population structure and growth; processes of speciation; interspecific competition and the niche concept; succession and community concepts; influence of climate and past events on the diversity and stability of communities in different regions of the world; and role of energy flow and biogeochemical cycling in determining the structure and productivity of ecosystems. Modern evolutionary theory is stressed throughout and attention is given to conflicting ecological hypotheses.

362 Chemical Oceanography in the Field Summer. 3 credits. S-U grades optional. Prerequisites: 1 year of introductory college chemistry and an introductory marine science course at the college level. A special 2-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details and application, consult the SML office, Stimson G14. Estimated cost: $410.

Daily lecs, labs, and fieldwork for 2 weeks. SML faculty.

A field-oriented course in the chemical oceanography of coastal waters. Lectures, frequent field trips, and laboratory sampling and analysis; includes tests of salinity, temperature, pH, chlorophyll, alkalinity, total CO_2, nutrients, organic material, and suspended materials in coastal waters, with some work on the analysis of coastal sediments.

363 Field Marine Science for Teachers Summer. 1 credit. S-U grades; letter grades optional, with consent of instructor. Primarily for teachers grades 6 through 12, but open to others. Prerequisite: 1 year of introductory college biology. A special 1-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details and application, consult the SML office, Stimson G14. Estimated cost: $210.

Daily lecs, labs, and fieldwork for 1 week. SML faculty.

Designed to give an overview of living marine organisms (algae, invertebrates, fishes, marine mammals, and shorebirds) and of the environment they inhabit. Fieldwork is emphasized. Occasional lectures and films deal with additional topics, such as coastal zone problems, marine fisheries, economics of marine organisms, and educational resources of the marine environment. The core faculty of marine biologists will be augmented by specialists in science and environmental education.

364 Field Marine Science Summer. 6 credits. S-U grades; letter grades optional, with consent of instructor. Prerequisite: 1 year of college biology or other supporting subject. A special 4-week course offered twice each summer at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details and application, consult the SML office, Stimson G14. Estimated cost: $820.

Daily lecs, labs, and fieldwork for 4 weeks. 3 core faculty assisted by approximately 25 visiting lecturers, including representatives of governmental agencies and commercial fishermen. SML faculty.

Designed for the student who desires an initial overview of the marine sciences, this course emphasizes living material in natural habitats. Most of the course work is concerned with the biology of intertidal plants and animals, biological oceanography, ichthyology, and fisheries. Attention also is given to introductory physical and chemical oceanography and marine geology. Marine ecology and the effects of human activity on the marine environment are included.

365 Underwater Research Summer. 3 credits. S-U grades optional. Prerequisites: recognized scuba certification and a medical examination. A special 2-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details and application, consult the SML office, Stimson G14. Estimated cost: $430.

Daily lecs and fieldwork for 2 weeks. Team-taught by a diving safety officer, a faculty member, and guest lecturers.

For competent divers only. Covers special problems of research underwater, including random sampling, use of dive tables, underwater instrumentation, special diving equipment, photographic techniques, integration with boat and shore facilities, and emergency procedures. Students are required to conduct a transect study on both soft and hard substrates.

366–370 SEA Semester In cooperation with the Sea Education Association (SEA), the Shoals Marine Laboratory offers a semester-length sequence of courses designed to provide college undergraduates with a thorough academic, scientific, and practical understanding of the sea. This sequence is repeated approximately every 2 months throughout the year. The first half of SEA Semester (the 6-week basic shore component) is spent in Woods Hole, Mass., receiving instruction in the marine and nautical sciences and studying our relationship with the sea. The second half of SEA Semester (the 6-week sea component) is spent at sea aboard R/V *Westward*. Applicants are interviewed in Ithaca before admission. Enrollment is open to men and women judged capable of benefiting from SEA Semester; no specific prior training or study is required. *Cornell students enrolled in the SEA Semester must take the entire sequence.*

For more details and applications, consult the Shoals Marine Laboratory office, Stimson G14. Program costs to be paid in lieu of regular Cornell tuition and fees: tuition for basic shore component, about $950; tuition plus room and board for sea component, about $2,050.

Instructors for the SEA Semester include faculty of the SEA, Cornell, Woods Hole Oceanographic Institution, Boston University, and others.

Basic Shore Component (6 weeks)

366 SEA Introduction to Marine Science
3 credits. Prerequisite: a laboratory course in physical or biological science, or equivalent.
A survey of the characteristics and processes of the global ocean. Oceanographic concepts are introduced and developed from their bases in biology, physics, chemistry, and geology. Provides a broad background in oceanography with special attention to areas pertinent to the subsequent *Westward* cruise. Guest lecturers from the Woods Hole research community interpret current trends and activities in this rapidly-evolving field. Students are encouraged to develop individual projects to be carried out at sea.

367 SEA Man and the Sea 2 credits.
An interdisciplinary consideration of our relationship with the marine environment. Included are the political, economic, social, and cultural results of our use of the sea for recreation, scientific research, food, fuel, minerals, and energy-efficient transportation. Covers the elements of maritime history, law, literature, and art necessary to appreciate our marine heritage and to understand contemporary maritime affairs. Examples of mariner's journals are studied in preparation for the diary required of each student at sea.

368 SEA Introduction to Nautical Science
3 credits. Prerequisite: college algebra or equivalent.
An introduction to the technologies of operation at sea. The concepts of navigation (piloting, celestial, and electronic), naval architecture, ship construction, marine engineering systems, and ship management are taught from their bases in physics and astronomy. Provides the theoretical foundation for the navigation, seamanship, and engineering that the student will employ at sea.

Sea Component (6 weeks)

Courses 369 and 370 take place aboard the R/V *Westward*, a 250-ton steel auxiliary-powered staysail schooner built in 1961. *Westward* normally puts to sea with a ship's company of 34. The professional staff of 9 includes the captain, 3 science watch officers, 3 deck watch officers, an engineer, and a steward. In addition, 1 or more visiting investigators are frequently aboard. Up to 25 students round out the complement.

369 SEA Marine Science Laboratory 4 credits.
Prerequisite: Biological Sciences 366.
The practice of oceanography at sea. The student is introduced to the oceanic environment, including its biological, physical, chemical, and geological aspects; is instructed in the operation of oceanographic equipment through the taking of samples and measurements; and practices reducing and analyzing data and solving simple problems related to the surrounding oceanic environment. Topics vary with the cruise track but include attention to all of the major subdisciplines of oceanography.

370 SEA Nautical Science Laboratory 4 credits.
Prerequisite: Biological Sciences 368.
The practice of nautical science at sea. The student is introduced to the technical and psychological problems of operation and existence in the physical environment of the ocean. Instruction and practice are provided in navigation, seamanship, marine engineering, and shipboard operations. Daily lectures build on the theoretical foundation established by the shore course and deal with the practical problems and applications presented by ship operation. During the final two weeks at sea, each student is expected to demonstrate, in succession, competence as navigator, deck watch officer, and engineering watch officer.

460 Insect Ecology (also Entomology 460) Fall. 4 credits. Each lab section limited to 16 students. Prerequisites: Biological Sciences 360 and Entomology 212, or their equivalents.

Lec, W F 11:15; lab, W 1:25–4:25; Friday or Saturday field trips during September and October. R. B. Root.

Ecological principles are integrated through the detailed analysis of insect life systems. Topics include the role of physical factors in population regulation; adaptive syndromes and the functional role of insects in terrestrial ecosystems; natural history of arthropod guilds; and contrast between natural and managed ecosystems. Field exercises demonstrate techniques for measuring population size and dispersion, life-table parameters, and community structure.

461 Oceanography Fall. 3 credits. S-U grades optional. Prerequisites: college physics and either Biological Sciences 260 or 360; or written permission of instructor.

Lec, T R 10:10; additional lec, R 12:20, alternating with disc, T or R 1:25. J. P. Barlow.

A general introduction to the oceans, with emphasis on physical and chemical processes that interact with marine communities. Discussions use case studies from current literature to illustrate application to problems in biological oceanography. Field techniques and analytical methods are demonstrated.

462 Limnology, Lectures Spring. 3 credits. Prerequisite: Biological Sciences 260 or 360 or written permission of instructor.

Lec, M W F 11:15. G. E. Likens.

A study of the interaction of biological communities and their aquatic environment. The physical, chemical, and biological dynamics of freshwater ecosystems.

463 Plant Ecology, Lectures Fall. 3 credits. Prerequisites: 2 advanced-level courses in biology, including Biological Sciences 360, or written permission of instructor. Some taxonomic familiarity with vascular plants helpful and concurrent enrollment in Biological Sciences 465 strongly recommended.

Lec, M W F 11:15. R. H. Whittaker.

Principles of plant-environment interactions in relation to the evolution, distribution, structure, and functioning of plants and plant communities.

464 Limnology, Laboratory Spring. 2 credits. Prerequisite: concurrent or previous enrollment in Biological Sciences 462.

Lab, T W R or F 1:25–4:25; 1 all-day field trip. G. E. Likens.

Field trips and laboratories devoted to studies of aquatic ecosystems.

465 Plant Ecology, Laboratory Fall. 1 credit. Prerequisite: concurrent enrollment in Biological Sciences 463 or an equivalent background in plant ecology.

Lab, F 12:05–5. R. H. Whittaker.

Laboratory and field exercises in plant ecology. Field studies of plant communities, and techniques for the analysis of community data, are emphasized.

[466 Chemical Ecology Fall. 2 credits. S-U grades optional. Prerequisites: 1 year of introductory biology for majors and either Chemistry 253, 358, or 360; or written permission of instructor. Offered in alternate years. Not offered 1979–80.

Lec, M W 8; occasional lec F 8. T. Eisner, P. P. Feeny, J. Meinwald, W. L. Roelofs, R. H. Whittaker.

Ecological and evolutionary significance of chemical interactions of organisms; summary of key processes in regulation of natural populations; survey of major classes of natural products with emphasis on appropriate analytical techniques; chemical adaptations for reproduction, defense, habitat selection, dispersal, feeding efficiency, and competition in animals, plants, and microorganisms; choice of adaptive strategy in relation to energy flow; and practical applications of chemical ecology.]

[**467 Species Distribution and Abundance** Fall. 3 credits. Prerequisite: Biological Sciences 360. Introductory statistics strongly recommended. Not offered 1979–80.
Lec, T R 1:25; field projects by arrangement. P. F. Brussard.
An advanced course emphasizing the unifying principles of ecology, biogeography, and population biology. Topics include the distribution of organisms in time and space, biogeographic regions, continental and island patterns of distribution, ecology of dispersal and colonization, ecological and genetic considerations of population structure, and factors determining population size. Includes projects and exercises designed to give students firsthand contact with field techniques and data analysis.]

468 Systems Ecology Spring. 4 credits. S-U grades optional. Limited to 30 students. Prerequisites: Biological Sciences 360 and calculus. Computer Science 102 strongly recommended.
Lec, M W F 10:10; disc, T or R 2:30–4:05. C. A. S. Hall.
An introduction to the quantitative study of populations, communities, and ecosystems. Emphasis on the development and validation of computer models based on component interactions and entire systems. Topics covered include relevant ecological principles, system diagramming, rudimentary mathematical techniques, simulation modeling, and the use of analog and digital computers. Format includes student presentations and guest lectures describing individual case histories in which a variety of methods were used for ecological analysis, simulation, or prediction. Each student is required to develop an original computer model.

469 Undergraduate Research in Ecology, Systematics, and Evolution Fall or spring. Variable credit. S-U grades optional. Undergraduates must attach to their course registration material written permission from the section chairperson and staff member who will supervise the work and assign the grade.
Hours to be arranged. Staff.
Practice in planning, conducting, and reporting independent laboratory and library research programs.

Research credits may not be used in completion of the ecology, systematics, and evolution concentration requirements.

[**470 Undergraduate Ecology Seminar** Fall or spring. 1 or 2 credits. May be repeated for credit. From time to time different seminars are offered. Not offered 1979–80.]

471 Mammalogy Fall. 4 credits. S-U grades optional, with consent of instructor. Prerequisite: Biological Sciences 274 or written permission of instructor.
Lec, W F 10:10; lab, M W or T R 1:25–4:25. 1 weekend field trip required. Labs will *not* start until Wednesday. P. J. Parker.
Lectures on the evolution, classification, distribution, and adaptations of mammals. Laboratory and fieldwork on systematics, ecology, and natural history of mammals of the world, with primary emphasis on the North American fauna. Systematics laboratories held in the museum at Research Park.

[**472 Herpetology, Lectures** Spring. 3 credits. S-U grades optional, with consent of instructor. Prerequisite: Biological Sciences 274 or equivalent experience in vertebrate zoology. Offered in alternate years. Not offered 1979–80.
Lec, M W F 12:20. F. H. Pough.
The evolution, distribution, and adaptations of amphibians and reptiles. Emphasis on ecology, behavior, physiology, and zoogeography.]

[**474 Herpetology, Laboratory** Spring. 2 credits. Enrollment limited. Prerequisite: concurrent enrollment in Biological Sciences 472. Offered in alternate years. Not offered 1979–80. Fee: $5
Lab, W F 1:25–4:25; several required field trips and at least 1 Saturday field project. Some lab work requires measurements to be made at intervals during day and evening. F. H. Pough.
Laboratory and fieldwork on systematics, ecology, behavior, and physiology.]

475 Ornithology Fall. 4 credits. S-U grades optional, with consent of instructor. Prerequisites: Biological Sciences 274 or equivalent, and written permission of instructor.
Lec and lab, T R 12:20–4:25; occasional field trips and special projects. T. J. Cade.
Lectures cover various aspects of the biology of birds, including anatomy, physiology, classification, evolution, migration and orientation, behavior, ecology, and distribution, and are fully integrated with laboratory studies. Laboratory includes studies of external and internal morphology, pterylosis, molts and plumages, specimen identification of birds of New York, and families of birds of the world. Several demonstration periods emphasize hybridization, evolution, adaptive radiation, mimicry, and geographic variation.

[**476 Biology of Fishes** Fall. 4 credits. S-U grades optional, with consent of instructor. Prerequisite: Biological Sciences 274, or equivalent experience in vertebrate zoology with written permission of instructor. Offered in alternate years. Not offered 1979–80.
Lec, M W F 9:05; lab to be arranged. E. B. Brothers.
An introduction to the study of fishes: their structure, classification, evolution, distribution, ecology, physiology, and behavior.]

477 Organic Evolution Fall. 4 credits. Prerequisites: Biological Sciences 281 and a working knowledge of elementary algebra and logarithms. A course with some taxonomic content, or experience in making a collection of some plant or animal group, recommended.
Lec, T R 11:15; lec or disc, R 12:20; optional sessions to be arranged. W. L. Brown.
Lectures and class discussions on organic evolution, with primary emphasis on the mechanisms of animal speciation and adaptation.

[**478 Biology of Fishes, Laboratory** Fall. 1 credit. Limited to 15 students. Prerequisite: concurrent enrollment in Biological Sciences 476. Offered in alternate years. Not offered 1979–80.
Lab, M 1:25–4:25; plus irregular hours as required for experiments and some required field trips. E. B. Brothers, J. B. Heiser.
Laboratory and fieldwork on structure, identification, ecology, physiology, and behavior of fishes, with emphasis on local species.]

[**662 Mathematical Ecology (also Statistics and Biometry 662)** Spring. 3 credits. Prerequisites: 1 year of calculus and a course in statistics. A general ecology course recommended. Offered in alternate years. Not offered 1979–80.
Lec, M W F 12:20. S. A. Levin, D. L. Solomon.
Mathematical and statistical analysis of populations and communities: theory and methods. Spatial and temporal pattern analysis, deterministic and stochastic models of population dynamics. Model formulation; parameter estimation, simulation, and analytical techniques. Diversity measures, life tables, ordination, and gradient techniques.]

[**664 Seminar in Coevolution between Insects and Plants (also Entomology 664)** Spring. 2 credits. S-U grades optional. Intended for seniors and graduate students. Limited to 15 students. Prerequisites: courses in entomology, ecology, evolution, and organic chemistry, and written permission of instructor. Offered in alternate years. Not offered 1979–80.
Hours to be arranged (1 evening each week). P. P. Feeny.
Presentations and discussions by students on the evolution of patterns of interaction between plants and insects, emphasizing critical evaluation of concepts and evidence.]

665 Limnology Seminar Fall. 1 credit. May be repeated for credit. S-U grades optional. Primarily for graduate students; written permission of instructor required for undergraduates.
Hours to be arranged. G. E. Likens.
A seminar course on advanced limnological topics.

666 Marine Ecology Spring. 3 credits. S-U grades optional. Prerequisites: Biological Sciences 260 or 360, and 461; or written permission of instructor.
Lec, M W F 9:05. J. P. Barlow.
An introduction to biological oceanography, including adaptation of organisms to marine environments, organization of pelagic and benthic communities, and dynamics of marine ecosystems, with some special consideration of current research in coastal and estuarine regions.

[**669 Plant Ecology Seminar** Fall. 1 credit. May be repeated for credit. S-U grades optional. Suggested for students majoring or minoring in plant ecology. Not offered 1979–80.
Hours to be arranged. B. F. Chabot.
Includes review of current literature, student research, and selected topics of interest to participants.]

670 Graduate Seminar in Vertebrate Biology Fall or spring. 1 credit. May be repeated for credit. Primarily for graduate students; written permission of instructor required for undergraduates.
Hours to be arranged. Vertebrate biology staff.
Seminar presentations and discussions by students on areas of current research in vertebrate biology. Topics vary from semester to semester.

679 (479) Ichthyology Fall. 5 credits. Enrollment limited. Prerequisites: Biological Sciences 476 and 478; or written permission of instructor. Offered in alternate years.
Lec, M W 10:10; lab, W F 1:25–5; plus irregular hours as required for experiments and some required field trips. Independent research project or term paper required. E. B. Brothers.
Lectures on advanced topics in fish biology, including systematics, ecology, behavior, life history, and literature. Laboratory studies of the orders, major families, and principal genera and of systematic procedures. Field studies of the ecology and life history of local species.

760 Special Topics in Evolution and Ecology Fall or spring. 1–3 credits. May be repeated for credit. S-U grades optional, with consent of instructor. Enrollment limited.
Hours to be arranged. Staff.
Independent or group intensive study of special topics of current interest. Content varies and is arranged between student and staff member.

761 Seminar in Population and Community Ecology Fall. 1 credit. May be repeated for credit. Prerequisite: permission of instructor.
Lec, T 4:25. P. F. Brussard.

765 Autecology Fall. 3 or 4 credits (4 credits with term paper). Offered in alternate years.
Lec, T R 10:10–11:30. B. F. Chabot and staff.
Comparison of the responses and adaptations of organisms to environment in selected ecosystems. Emphasis on similarities and differences in molecular and organismal mechanisms by which plants and animals cope with their environments.

766 Population Ecology Spring. 3 or 4 credits (4 credits with term paper). Prerequisite: graduate standing with some background in calculus, statistics, ecology, and evolutionary theory; or written permission of instructor. Offered in alternate years.
Lec and disc, M W F 9:05. P. F. Brussard, S. A. Levin.
Critical examination of the properties and dynamics of populations. Emphasis on theories of population structure, dynamics, and regulation. Discussion of experimental approaches to analyses of natural populations.

[767 Community Ecology Fall. 3 or 4 credits (4 credits with term paper). Prerequisite: Biological Sciences 360 or equivalent, or written permission of instructor. Offered in alternate years. Not offered 1979–80.
Lec, T R 10:10–12:05. R. H. Whittaker and staff.
The structure and dynamics of natural communities; patterning and sampling problems; species diversity; niches and gradient relations; and ordination, classification, succession, climax, and disturbance. Comparative aspects of terrestrial, marine, and freshwater communities are stressed.]

[768 Ecosystems Spring. 3 or 4 credits (4 credits with term paper). Prerequisite: Biological Sciences 360 or equivalent, or written permission of instructor. Offered in alternate years. Not offered 1979–80.
Lec, T R 10:10–12:05. G. E. Likens and staff.
Analysis of ecosystems in terms of energy flow, nutrient circulation, and model systems. Emphasis on the functional properties of ecosystems, from simple systems to the biosphere as a whole.]

Introductory Parasitology and Symbiology (Veterinary Medicine 330) Spring. 3 credits. Prerequisite: 1 year of introductory biology.
Lec, T R 11:15; lab, T 2–4:25. J. H. Whitlock, J. R. Georgi.
A study of unrelated species living together in intimate physiological association. Parasitoses that result in disease in the host are presented as important and special cases of the symbiotic spectrum. Emphasis is placed on an integrative study of the causation of disease in human beings and in cultivated and natural populations of plants and animals. The biological functions of disease and the impact of human activities on the disease structure of populations are examined. Laboratory exercises involve a broad range of symbiotes and pathogens, from viruses to nemas and arthropods.

Related Courses in Other Departments

Advanced Insect Taxonomy (Entomology 631, 632, 633, 634)

Advanced Soil Microbiology (Agronomy 606)

Advanced Work in Animal Parasitology (Veterinary Medicine 737)

Bionomics of Freshwater Invertebrates (Entomology 471)

Ecological Animal Physiology (Biological Sciences 315, 317)

Human Paleontology (Anthropology 374)

Insect Biology (Entomology 212)

Insect Pathology (Entomology 453)

Introductory Insect Taxonomy (Entomology 331)

Invertebrate Zoology (Biological Sciences 310)

Microbial Ecology (Agronomy 410 and Microbiology 492)

Parasitic Helminthology (Veterinary Medicine 440)

Phycology (Biological Sciences 348)

Soil Microbiology (Agronomy 406)

Taxonomy and Evolution of Vascular Plants (Biological Sciences 346, 442)

Teaching Experience (Biological Sciences 403–404)

Vertebrate Social Behavior (Biological Sciences 427)

Genetics and Development

281 Genetics Fall or spring. 5 credits. Not open to freshmen in fall semester. Prerequisite: 1 year of introductory biology or equivalent. Students who have taken Biological Sciences 282 may register only with written permission of instructor.
Lec, T R 10:10–11:30; lab, M T W or R 2:30–4:25. Lab sections may also be scheduled T or R 8–9:55, W or F 10:10–12:05, F 2:30–4:25, or Saturday 10:10–12:05, if enrollment requires it. Students do not choose lab sections during course enrollment; lab assignments are made at the end of first lec period. Fall: R. J. MacIntyre; spring: P. J. Bruns; lab, H. T. Stinson.
A general study of the fundamental principles of genetics in eucaryotes and procaryotes. Discussions of gene transmission, gene action and interaction, gene linkage and recombination, gene structure, gene and chromosome mutations, genetic aspects of differentiation, genes in populations, breeding systems, and extrachromosomal inheritance. In the laboratory students perform experiments with microorganisms and conduct an independent study of inheritance in *Drosophila*.

282 Human Genetics Spring. 3 credits. Each disc section limited to 25 students. Prerequisite: 1 year of introductory biology or equivalent. Students who have taken Biological Sciences 281 may register only with written permission of instructor.
Lec, M W 10:10; disc, R or F 10:10 or 11:15 (1 disc section R 10:10, 2 sections R 11:15, 4 sections F 10:10, and 1 section F 11:15). A. M. Srb.
An introduction to biological heredity through consideration of human genetics. Advances in the science of genetics are having a profound effect on our understanding of ourselves and on our potential for influencing our present and future well-being. The course is intended primarily to contribute to the student's general education in these matters. Although certain aspects of genetics are considered with some rigor, the course is not designed to serve as a prerequisite to advanced courses in genetics.

384 Invertebrate Embryology Summer. 3 credits. S-U grades optional. Prerequisite: Biological Sciences 364 or a course in invertebrate zoology. A special 2-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details and application, consult the SML office, Stimson G14. Estimated cost: $410.
Daily lecs, labs, and fieldwork for 2 weeks. SML faculty.
A comparative study of aspects of reproduction and early development in selected invertebrates, providing a classical approach to the morphology of the gonads, fertilization, various kinds of cleavage and gastrulation, and the formation of larvae. For each group, students first consider gametes during formation in the gonads, then development of a new individual through fertilization and the formation of the early larval structure.

[385 Developmental Biology Fall. 3 credits. Prerequisite: Biological Sciences 281. Not offered 1979–80.
Lec, M W F 11:15. A. W. Blackler.
Morphogenetic, cellular, and genetic aspects of the developmental biology of animals.]

[389 Vertebrate Developmental Anatomy Fall. 3 credits. Limited to 40 students, with preference given to seniors. Prerequisite: elementary knowledge of mammalian anatomy. Not offered 1979–80.
Lec, M 10:10; lab, W or F 1:25–4:25.
A. W. Blackler.
Lecture serves as introduction to the laboratory session. Laboratory has a strong morphogenetic theme.]

[481 Population Genetics Fall. 3 credits. S-U grades optional. Prerequisite: Biological Sciences 281 or equivalent. Not offered 1979–80.
Lec, M W 10:10. B. Wallace.
A study of factors that influence the genetic structure of Mendelian populations and that are involved in race formation and speciation. Four quizzes (on the mathematical aspects of population genetics) and an optional term paper determine the final grade.]

482 Plant Cell Genetics (also Plant Breeding 482) Spring. 2 credits. S-U grades optional. Prerequisites: Biological Sciences 281 or Plant Breeding 225 or equivalent, and Biological Sciences 242 or equivalent.
Lec and demonstration, T R 10:10. R. S. Chaleff.
General principles and techniques of plant cell and tissue culture and of their application in genetic studies of higher plants. Discussions of the culture of cells, protoplasts, microspores, and callus; the isolation and characterization of mutant clones; and the regeneration and genetical analysis of plants from such clones.

[483 Molecular Aspects of Development Fall. 3 credits. Prerequisite: Biological Sciences 330 or 331. Not offered 1979–80.
Lec, M W F 11:15. Staff.
An examination of the molecular biology of developing systems. Emphasis on understanding the mechanisms involved in gene expression in developing systems, both at the transcription and translation levels. Specific topics include regulation of RNA synthesis and utilization, nucleo-cytoplasmic interactions, and induction of cell-specific protein synthesis. Examples are discussed from both higher and lower eucaryotic systems.]

484 Molecular Evolution Spring. 3 credits. Prerequisites: Biological Sciences 281 and organic chemistry. Offered in alternate years.
Lec, T R 11:15. R. J. MacIntyre.
An analysis of evolutionary changes in proteins and nucleic acids, and gene-enzyme variability in natural populations. The role of natural selection in effecting these changes and maintaining genetic variation at the molecular level is critically examined. Theories on the evolution of the genetic code and the construction of phylogenetic trees from biochemical data are discussed.

485 Microbial Genetics, Lectures Fall. 2 credits. S-U grades optional. Limited to upperclass and graduate students. Prerequisites: Biological Sciences 281 and Microbiology 290; or written permission of instructor.
Lec, W 7:30–9:25 p.m. S. A. Zahler.
Genetics of bacteria and their viruses, with emphasis on the mechanisms of genetic phenomena.

486 Immunogenetics (also Animal Science 486) Spring. 3 credits. Enrollment limited. Prerequisites: Biological Sciences 281 or Animal Science 221, and a course in immunology or permission of instructor.
Lec, M W F 9:05; disc, W or R 12:20. R. R. Dietert.
The genetic control of a variety of cellular antigens and their use in understanding biological and

immunological functions. The genetics of antibody diversity, antigen recognition, immune response, transplantation, and disease resistance are discussed.

487 Microbial Genetics, Laboratory Fall. 3 credits. Primarily for upperclass students. Limited to 20 students. Prerequisites: Biological Sciences 485 (may be taken concurrently), Microbiology 291 or equivalent, and written permission of instructor.
Lab, T 1:25–4:25; additional hours to be arranged. S. A. Zahler.
Problem solving in bacterial genetics.

488 Genetics of Lower Eucaryotes Spring. 3 credits. S-U grades optional. Prerequisites: Biological Sciences 281 and a course in organic chemistry.
Lec, M W 9:05. P. J. Bruns, G. R. Fink, A. M. Srb.
Genetic aspects of the biology of a few eucaryotic microorganisms — primarily yeast, *Neurospora,* and ciliated protozoa — with emphasis on the use of these organisms as experimental tools. Major topics covered include gene action, control mechanisms, cytoplasmic genetic systems, recombination and conversion, morphogenetic systems, and evolutionary aspects of physiological systems. Extensive appropriate reading in the original literature of genetics is a primary component of the course.

489 Undergraduate Research in Genetics and Development Fall or spring. Variable credit. Undergraduates must attach to their course registration material written permission from the staff member who will supervise the work and assign the grade.
Hours to be arranged. Staff.
Practice in planning, conducting, and reporting independent laboratory and library research programs.

No more than 4 credits of research may be used in completion of the genetics and development concentration requirements.

780 Current Topics in Genetics Fall or spring. 2 credits. May be repeated for credit. S-U grades optional, with consent of instructor. Primarily for graduate students, with preference given to majors in the Field of Genetics; written permission of instructor required for undergraduates. Limited to 20 students. No auditors.
Hours to be arranged. Staff.
A seminar course with critical presentation and discussion by students of original research papers in a particular area of current interest. Content of the course and staff direction varies from term to term and will be announced a semester in advance.

Related Courses in Other Departments

Animal Cytogenetics (Animal Science 419)

Behavioral Neurogenetics (Biological Sciences 624)

Current Topics in Biochemistry (Biological Sciences 732–739)

Cytogenetics (Biological Sciences 446)

Cytology (Biological Sciences 347)

Organic Evolution (Biological Sciences 477)

Physiological Genetics of Crop Plants (Plant Breeding 605)

Plant Growth and Development (Biological Sciences 644)

Teaching Experience (Biological Sciences 403–404)

Graduate School of Business and Public Administration

NCC Common Core Courses

NCC 500 Managerial Accounting

NCC 501 Quantitative Methods for Management

NCC 502 Economic Principles for Management

NCC 503 Computers and Decision Making

NBP Business Administration Program Core Courses

NBP 500 Marketing Management

NBP 501 Operations Management

NBP 502 Corporate Financial Management

NBP 503 Business Policy

NBP 504 Interaction of the Economic, Social, and Legal Environments with Organizations

NBA Business Administration Elective Courses

NBA 500 Intermediate Accounting

NBA 501 Advanced Accounting

NBA 502 Cost Accounting

NBA 504 Introduction to Taxation Affecting Business and Personal Decision Making

NBA 505 Auditing

NBA 506 Financial Information Evaluation

NBA 507 Federal Income Tax

NBA 508 Advanced Cost Accounting

NBA 510 Law of Business Associations

NBA 511 Advanced Business Law

NBA 513 An Introduction to Estate Planning

NBA 514 Financial Policy Decisions

NBA 515 Short-Term Financial Management

NBA 516 Investment Management

NBA 517 Economics of Securities Markets

NBA 518 Financial Markets and Institutions

NBA 519 Seminar in Bank Management

NBA 521 Finance Theory

NBA 523 Topics in International Financial Management

NBA 524 Options, Bonds, and Commodities

NBA 525 Financial Management

NBA 540 Sales Management

NBA 541 Marketing Research

NBA 542 Advertising Management

NBA 543 Marketing Strategy

NBA 544 Intermediate Marketing: Topics and Cases

NBA 545 Management of Marketing Intermediaries

NBA 546 Marketing Decision Models

NBA 547 Demand Analysis for Marketing Planning

NBA 548 Industrial Marketing

NBA 549 Consumer Behavior

NBA 550 Special Topics in Marketing Management

NBA 551 Topics in Consumer Behavior

NBA 552 Seminar in Current Marketing Research

NBA 560 Problems and Techniques in Production Management

NBA 561 Case Studies in Production and Operations Management

NBA 562 Business Logistics Management

NBA 565 Small Business and the Entrepreneur

NPP Public Administration Program Core Course

NPP 500 The Conduct of Public Affairs

NPA Public Administration Elective Courses

NPA 500 Urban Government Operations

NPA 502–503 Economics and Public Policy Workshop

NPA 504 Science, Technology, and Public Policy

NPA 505 Public Financial Management

NPA 506 Politics of Decentralization and Local Reform

NPA 507 Integrative Seminar: Education for Public Management Program (Part I)

NPA 508 Integrative Seminar: Education for Public Management Program (Part II)

NPA 509–510 Democracy at Bay: Politics of Policymaking in Britain and France

NPA 512 Seminar in Public Systems Analysis

NPA 514 Economic Foundations of Public Policy

NPA 515 The Politics of Technical Decisions I

NPA 516 The Politics of Technical Decisions II

NPA 518 Public Administration Colloquium

NPA 520 Legal Methods

NPA 521 Energy and Public Policy

NPA 523 Policy Considerations: The Business-Government Interface

NPA 524 Public Applications and Extensions of Managerial Finance

NPA 525 Urban Service Systems

NHP Hospital and Health Services Administration Program Core Course

NHP 500 Introduction to Hospital and Medical Care Organization

NHA Hospital and Health Services Administration Program Elective Courses

NHA 500 Social Psychology of Health Organizations

NHA 501 Hospital Corporate Planning

NHA 502 Psychiatric Institutions: Administration and Practice

NHA 503 Sociopolitical Aspects of Community Health Services and Delivery

NHA 504 Legal Aspects of Hospital Administration

NHA 505 Health Services Research and Evaluation

NHA 506 Health Economics

NHA 507 Health and Welfare Policy

NHA 508 Health Maintenance, Organization Development, and Management

NHA 509 Health Operations Management and Planning

NHA 510 Seminar in Hospital Governance and Decision Making

NHA 511 Field Studies in Health Administration and Planning

NHA 513 Health and Social Services Organization and Planning

NHA 514 Washington Health Policy Field Seminar

NHA 515 Orientation to Tertiary Hospital Services

NHA 516 Selected Topics in the Administration of Teaching Hospitals

NHA 517 Introduction to Clinical Medicine: The Physician, the Hospital, and the Delivery of Medical Care

NHA 518 Financial Management of Hospitals

NHA 519 Comparative Developments in Health Services

NHA 520 Labor Relations in the Health Industry

NCE Common Course Electives

NCE 500 Fund Accounting

NCE 505 International Trade and Finance

NCE 507 American Business Operations Abroad

NCE 508 Administration of Public Operations Abroad

NCE 510 Seminar on Development Administration

NCE 514 Administration of Agricultural and Rural Development

NCE 524 Economic Evaluation of Capital Investment Projects

NCE 525 Intermediate Microeconomic Theory

NCE 526 Problems and Practices: The Business-Government Interface

NCE 527 American Industry: Economic Analysis and Public Policy

NCE 528 Topics in Managerial Economics

NCE 529 The Economics of Pollution Control

NCE 540 Organization Theory and Behavior

NCE 541 Personnel Administration and Human Relations

NCE 542 Processes and Techniques in Organizational Development

NCE 543 Organizational Behavior and Administration

NCE 545 Seminar in Organization Theory

NCE 548 Behavioral Science and Managing

NCE 549 Sociotechnical Issues in Office Automation

NCE 551 Behavioral Decision Theory

NCE 560 Applied Probability

NCE 561 Applied Statistics

NCE 562 Operations Research I

NCE 563 Operations Research II

NCE 564 Applied Multivariate Analysis

NCE 565 Applied Econometrics

NCE 566 Management Science

NCE 567 Analysis of Management Decisions

NCE 570 Data Base Systems

NCE 571 Computer Systems Analysis

NCE 580 Seminar in University Administration

NCE 581 Management Writing

NMI and NRE Research

NMI 500–502 Directed Reading and Research

NMI 510 Investment Analysis: Language Model Building Laboratory

NRE 503 Doctoral Seminar in Finance

NRE 504 Doctoral Seminar in Accounting

NRE 505 Finance Workshop

NRE 506 Doctoral Seminar in Monetary Economics

NRE 942 Social Psychology of Organizing

College of Engineering

Engineering programs offered at Cornell lead to the degrees of Bachelor of Science, Master of Engineering, Master of Science, and Doctor of Philosophy. Descriptions of courses, including both undergraduate and graduate offerings, are given under the appropriate academic areas.

Information about academic programs, admissions and financial aid, and special opportunities for engineering students is given in other publications of the Announcement series: *Academic Information*, *General Information*, *Engineering at Cornell* (for prospective undergraduates), the *Announcement of the Graduate School*, and *Graduate Study in Engineering and Applied Science*.

Division of Basic Studies

The courses available through the Division of Basic Studies include certain engineering courses offered by the various schools and departments of the College of Engineering primarily for underclass students; these courses are described below. Additional engineering courses that may be taken during the freshman and sophomore years in the Division of Basic Studies are described under the appropriate subject areas. Courses in mathematics, physics, and chemistry are described under the appropriate departments of the College of Arts and Sciences.

Engineering Basic Studies

DBS 105 Introduction to Computer Programming Fall or spring. 3 credits. 2 lec, 1 rec (optional); 4 evening tests. (DBS 105 is the same as the mathematical section of Computer Science 100.)
An introduction to elementary computer programming concepts. Emphasis is on techniques of problem analysis, algorithm and program development, and program testing. The principal programming language for the course is PL/I; FORTRAN is also introduced and is used for final problems on the mathematical applications of computers. Normally, the IT batch system is used for computer processing, but students can elect to use interactive terminals under the SCMS–PL/CT system. The course does not presume any previous programming experience, but a special elective section during the first three weeks accommodates students who have had some previous exposure to computing.

DBS 106 Engineering Perspectives Fall or spring. 3 credits.
Weekly lecture series for 1 credit plus a supplemental course program for 2 credits. For the course program, each student chooses either (1) two sequential short courses, called mini-courses, for 1 credit each, or (2) a 2-credit full-semester engineering course, or (3) a 2-credit full-semester research option under which freshmen work closely with faculty members in ongoing research projects.

Engineering Core Sciences

Group I

OR&IE 213 Systems Analysis and Design Fall. 3 credits. 2 lec, 1 rec. Prerequisite: first-year calculus.
A general introduction to the problems and techniques of systems engineering and operations research. Includes formation and solutions of problems that can be modeled as networks (shortest path, project scheduling, maximum flow), dynamic programs (inventory and distribution), linear resource allocation problems, and games (conflict resolution and voting). Effects of uncertainty on decision making.

OR&IE 260 Introductory Engineering Probability Fall or spring. 3 credits. 3 lec. Prerequisite: first-year calculus.
The basic tools of probability and their use in engineering. 260 may be the last course in probability for some students, or it may be followed by OR&IE 361, Stochastic Processes I, or by OR&IE 370, Statistics. Definition of probability; random variables; probability distributions, density functions, expected values; jointly distributed random variables; distributions such as the binomial, Poisson, and exponential that are important in engineering, and how they arise in practice; limit theorems.

OR&IE 270 Basic Engineering Statistics Fall or spring. 3 credits. 2 lec, 1 rec. Students who intend to enter the upperclass Field Program in Operations Research and Industrial Engineering should take OR&IE 260 instead of this course. Prerequisite: first-year calculus.
At the end of this course a student should command a working knowledge of basic statistics as it applies to engineering work. For many students this will be the only course in statistics. For students who wish to learn more about statistics, a course in probability (OR&IE 260) followed by a course in statistics (OR&IE 370) is recommended.

Com S 211 Computers and Programming Fall or spring. 3 credits. 2 lec, 1 lab; 2 evening quizzes. Prerequisite: Computer Science 100 or equivalent programming experience.
Intermediate programming in PL/I: procedures, block structures, on conditions, recursion. Introduction to basic data structures and program analysis and simulation. Programming assignments for a variety of applications.

Com S 321 Introduction to Numerical Analysis Fall. 4 credits. 3 lec. Prerequisites: Mathematics 293 or 221 and knowledge of PL/I or FORTRAN.
This course aims to acquaint prospective users of numerical subroutines with the use, availability, and algorithmic composition of good mathematical software. Students write FORTRAN drivers to use a library of FORTRAN subroutines to solve exercises in linear algebra, spline interpolation, and numerical integration. Stress is given to determining whether a problem is numerically well posed.

Group II

Ele E 210 Introduction to Electrical Systems Fall or spring. 3 credits. 3 lec-rec. Prerequisites: Mathematics 192 and Physics 112.
Electrical circuit elements; circuit equations and methods of solutions; time functions and their representation; response of simple networks; impedance concept; pole-zero concept; modeling of electronic devices; elementary amplifiers; transfer function and frequency response.

Ele E 230 Introduction to Digital Systems Fall or spring. 3 credits. 2 lec, 5 lab experiments.
Introduction to basic analysis and design techniques and methodology of digital and computer systems. Boolean algebra; integrated circuit components used in digital system implementation; codes and number systems; logic design of combinational circuits; logic design of sequential circuits.

MS&E 262 Introduction to Electrical Properties of Materials Spring. 3 credits. 2 lec, 1 rec or lab.
Electronic structure of atoms, molecules, and crystalline solids. Electrical conductivity and other electrical properties of metals, semiconductors, and insulators. Semiconductors and their applications in electronic devices. Magnetism and magnetic materials. Introduction to lasers.

A&EP 206 The Physics of Life Fall. 3 credits. 3 lec. Prerequisite: concurrent registration in Physics 213 or permission of instructor.
W. Webb.
An in-depth study of four biological topics from a physical point of view. Topics covered are photosynthetic conversion of light into chemical energy, proteins as transport and production machines, membranes, and biophysical aspects of replication. Topics are chosen to illustrate the unity and interdependence of living matter.

A&EP 217 Contemporary Topics in Applied Physics Spring. 3 credits. 2 lec, 1 rec-lab. Prerequisite: Physics 213.
R. A. Buhrman.
An introduction to selected applications of modern physics to advanced technology. This course deals with both present and potential approaches to large-scale energy conversion. In particular, the basic physical principles and fundamental limitations of nuclear energy (in terms of both fission and fusion) and of solar energy utilization are presented. One objective of the course will be to give a current view of the present status and future directions of research and development in energy-related fields.

Group III

T&AM 202 Mechanics of Solids Fall or spring. 3 credits. 2 lec, 1 rec, 1 lab; evening exams. Prerequisite: coregistration in Mathematics 293.
Principles of statics, force systems, and equilibrium. Frameworks. Mechanics of deformable solids, stress, strain, statically indeterminate problems. Mechanical properties of engineering materials. Axial force, shearing force, bending moment, singularity functions. Plane stress, Mohr's circle. Bending and torsion of bars; buckling and plastic behavior.

T&AM 203 Dynamics Fall or spring. 3 credits. 2 lec, 1 rec, 1 lab; evening exams. Prerequisite: coregistration in Mathematics 294.
Newtonian dynamics of a particle, systems of particles, and a rigid body. Kinematics, motion relative to a moving frame. Impulse, momentum, angular momentum, energy. Rigid body kinematics, angular velocity, moment of momentum and the inertia tensor. Euler equations, the gyroscope. Advanced methods in dynamics.

MS&E 261 Introduction to Mechanical Properties of Materials Fall or spring. 3 credits. 2 lec, 1 rec or lab.
The relation of mechanical properties to microscopic structures and defects inside metals and other materials. Deformation of rubber-like polymers. Permanent changes in the shape of crystals caused by the action of stresses. Effect of movement of atoms on the strength of solids at high temperatures. Manipulation of microscopic structure for high strength. Fracture and fatigue failure.

Group IV

Chem 287, 289 Introductory Physical Chemistry and Laboratory Fall. 5 credits. 2 or 3 lec, 1 rec in 287; 1 lec, 2 labs in 289. Prerequisites: Chemistry 208 or 216 and Mathematics 191–192.
A systematic treatment of the fundamental principles of physical chemistry. Essential experimental skills are developed.

Chem 288, 290 Introductory Physical Chemistry and Laboratory Spring. 5 credits. 2 or 3 lec, 1 rec in 288; 1 lec, 2 labs in 290. Prerequisite: Chemistry 287 and 289.
A continuation of Chemistry 287, 289.

Chem 357* Introductory Organic Chemistry Fall. 3 credits. 3 lec, optional rec may be offered. Prerequisite: Chemistry 208 or 216.
A systematic study of the more important classes of carbon compounds, reactions of their functional groups, methods of synthesis, relations, and uses.

Chem 358* Introductory Organic Chemistry Spring. 3 credits. 3 lec, optional rec may be offered. Prerequisite: Chemistry 357.
A continuation of Chemistry 357.

M&AE 221 Thermodynamics Fall or spring. 3 credits. 3 rec. Prerequisites: Mathematics 191–192 and Physics 112.
The definitions, concepts, and laws of thermodynamics. Applications to ideal and real gases, multiphase pure substances, gaseous mixtures, and gaseous reactions. Heat-engine and heat-pump cycles. An introduction to statistical thermodynamics.

Chem E 111 or 110 Mass and Energy Balances 111, fall; 110, spring (110 not offered spring 1980). 3 credits. Prerequisites: one year of freshman chemistry and permission of instructor before course enrollment for the fall term. Chemistry 111 is recommended for students planning to enter the Field Program in Chemical Engineering.
R. G. Thorpe.
Engineering problems involving material and energy balances. Batch and continuous reactive systems in the steady and unsteady states. Humidification processes. Chemical Engineering 110 differs from 111 in that it uses *only self-paced audiovisual instruction at the convenience of the student.* A minimum of 70 clock hours of audiovisual instruction is required to master the subject matter. Student performance in 110 is evaluated by nine tests, two preliminary examinations, and a final examination; superior students may earn exemption from the final examination.

Aerospace Engineering

See "Mechanical and Aerospace Engineering."

Agricultural Engineering

See "Agricultural Engineering," under College of Agriculture and Life Sciences.

Applied and Engineering Physics

206 The Physics of Life Fall. 3 credits. 3 lec. Prerequisite: concurrent registration in Physics 213 or permission of instructor.
W. Webb.
See description under Division of Basic Studies.

217 Contemporary Topics in Applied Physics Spring. 3 credits. 2 lec, 1 rec-lab. Prerequisite: Physics 213.
R. A. Buhrman.
See description under Division of Basic Studies.

303 Introduction to Nuclear Science and Engineering I Fall. 3 credits. 3 lec. Prerequisite: Physics 214 or Mathematics 294. This course and A&EP 304 form a coordinated two-term sequence designed for juniors or seniors from any engineering field who want to prepare for graduate-level nuclear science and engineering courses at Cornell or elsewhere. The sequence can also serve as a terminal introduction to the field. 303 is a reasonably self-contained unit that can be taken by itself by those desiring only one term.
D. D. Clark.
Introductory overview of atomic and nuclear physics; nuclear structure, radioactivity, nuclear reactions, interaction of radiation with matter; reactor physics: neutron moderation, neutron diffusion, the steady-state chain reaction, reactor kinetics. At the level of *Introduction to Nuclear Engineering* by Lamarsh.

304 Introduction to Nuclear Science and Engineering II Spring. 3 credits. 3 lec. Prerequisite: A&EP 303.
D. A. Hammer.
Reactor engineering: heterogeneous reactors, dynamic behavior and control, heat transfer; overview of controlled fusion: fuel cycles, reactor configurations, engineering problems; radiation: biological effects, shielding, radiation protection, damage and materials problems; reactor safety, licensing, and siting.

333 Mechanics of Particles and Solid Bodies Fall. 4 credits. 3 lec, 1 rec.
B. Kusse.
Newton's laws; coordinate transformations; generalized coordinates and momenta. Lagrangian and Hamiltonian formulation; applications to oscillator, restrained motion, central forces, small vibrations of multiparticle systems, motion of rigid body.

355 Intermediate Electromagnetism Fall. 4 credits. Prerequisites: Physics 214 and 216 and coregistration in Mathematics 421 or T&AM 610, or permission of instructor.
D. Hammer.
Topics: vector calculus; electrostatics, magnetostatics, and induction phenomena; Laplace's equation solutions in Cartesian, cylindrical, and spherical systems; dielectrics, paramagnetic and diamagnetic materials, electric and magnetic forces, energy storage, skin effect, quasistatics. Emphasis on physical concepts and applications.

356 Intermediate Electrodynamics Spring. 4 credits. Prerequisite: 355, coregistration in Mathematics 422 or T&AM 611, or permission of instructor.
Development of electromagnetic wave phenomena and radiation. Topics include transmission lines, waveguides, wave properties of dispersive media, radiation and scattering phenomena, reciprocity, physical optics, and special relativity.

361 Introductory Quantum Mechanics Spring. 4 credits. 3 lec, 1 rec. Prerequisites: A&EP 333 or Physics 318; coregistration in Mathematics 422 or T&AM 611 and in A&EP 356 or Physics 326.
J. Silcox.
A first course in the systematic theory of quantum phenomena. Topics include the square well, harmonic oscillator, hydrogen atom, and perturbation theory. At the level of Chapters 4–9 of *Modern Physics and Quantum Mechanics* by Anderson.

363 Electronic Circuits (also Phys 360) Fall or spring. 4 credits. Prerequisite: Physics 208 or 213 or permission of instructor; no previous experience with electronics is assumed. 1 lec, 2 labs.
A. Kuckes, spring.
Basic analysis and design of semiconductor circuits useful in electronic instrumentation such as amplifiers, oscillators and waveform generators; switching, digital, and timing circuits; and power supplies. At level of *Introductory Electronics for Scientists and Engineers* by Simpson.

[401 Physics of Atomic and Molecular Processes Fall. 3 credits. Prerequisite: A&EP 361, Physics 443, or permission of instructor. Not offered 1979–80.
J. Silcox.
An introduction to the basics of contemporary problems in the physics of atomic and molecular processes, including atomic structure, chemical bonding, polarization, radiation resonance processes, and atomic and molecular spectroscopy.]

423 Statistical Thermodynamics Spring. 4 credits. 3 lec, 1 rec. For engineering physics seniors; others by permission of instructor.
M. Nelkin.
Quantum statistical basis for equilibrium thermodynamics, canonical and grand canonical ensembles, and partition functions. Quantum and classical ideal gases and paramagnetic systems. Fermi-Dirac, Bose-Einstein, and Maxwell-Boltzmann statistics. Introduction to systems of interacting particles. At the level of *Thermal Physics* by Kittel and *Statistical and Thermal Physics* by Reif.

434 Continuum Physics Fall. 4 credits. Prerequisite: A&EP 333 or equivalent.
R. V. Lovelace.
Linear elasticity theory; tensor and vector formalisms; elementary engineering applications, crystal anisotropy, dislocations. Elastic and inelastic waves. Hydrodynamics; Navier-Stokes equations, ideal and viscous fluids, compressible and incompressible flows; elementary applications, lift, drag, convection, surface waves, simple shocks, sound, introduction to linear response theory, dimensional analysis, instabilities and turbulence, subcritical and supercritical flows.

490 Informal Study in Engineering Physics Credit to be arranged.
Laboratory or theoretical work in any branch of engineering physics under the direction of a member of the staff.

601 Photosynthesis (also Biological Sciences 445) Fall. 3 credits. Prerequisites: Chemistry 104 or 208, Mathematics 106 or 111, and Physics 102 or 208, or permission of instructor. Offered alternate years.
R. K. Clayton.
A detailed study of the process by which plants use light in order to grow, emphasizing physical and physiochemical aspects.

606 Introduction to Plasma Physics (also Electrical Engineering 681) Fall. 3 credits. 3 lec. Prerequisites: A&EP 355, 356, or equivalent. Open to fourth-year students at discretion of instructor.
R. N. Sudan.
Plasma state; motion of charged particles in fields; collisions, coulomb scattering; transport coefficients, ambipolar diffusion, plasma oscillations and waves; hydromagnetic equations; hydromagnetic stability and microscopic instabilities; test particle in a plasma; elementary applications.

607 Advanced Plasma Physics (also Electrical Engineering 682) Spring. 3 credits. 3 lec. Prerequisite: A&EP 606.
R. N. Sudan.
Boltzmann and Vlasov equations; Chew-Goldberger-Low theory; waves in hot plasmas; Landau damping. Micro-instabilities; effects of collisions and Fokker-Planck terms; method of dressed test particles; high-frequency conductivity and fluctuations; neoclassical toroidal diffusion, relativistic beams.

*Premedical and bioengineering students may substitute Organic Chemistry 253–251 for Organic Chemistry 357–358 as an engineering core science course. The Chemistry 253–251 sequence will be counted as two engineering core sciences from Group IV.

608 Plasma Astrophysics (also Astronomy 660) Spring. 2 credits.
R. V. Lovelace.
Selected topics discussed in detail: (a) the solar corona and the solar wind; (b) the propagation of cosmic rays in interplanetary and interstellar space; and (c) the theory of aligned rotating magnetospheres.

609 Low-Energy Nuclear Physics Fall. 4 credits. 3 lec. Prerequisite: an introductory course in modern physics, including quantum mechanics.
V. Kostroun.
The nuclear interaction. Properties of ground and excited states of nuclei; models of nuclear structure; alpha, beta, gamma radioactivity, low-energy nuclear reactions—resonant and nonresonant scattering, absorption, and fission. At the level of *Introduction to Nuclear Physics* by Enge.

[610 Biophysical Processes Fall. 3 credits. Prerequisites: basic courses in biology, physics, physical chemistry, and mathematics, such as Mathematics 422 or 433, Physics 315 or 341, Chemistry 390, or permission of instructor. Not offered 1979–80.
W. W. Webb.
Statistical thermodynamics of biomolecules and electrolytes; dissipative processes; diffusive, electrochemical, coupled and convective transport; fluctuations and kinetics; cell membranes; biological macrostructures; physical probes.]

611 Vision (also Biological Sciences 395) Fall. 3 credits. Prerequisites: Chemistry 104 or 208, Mathematics 106 or 111, Physics 102 or 208, or permission of instructor. Offered alternate years.
R. K. Clayton.
Study of the mechanisms of seeing, embracing biological, physical, and chemical approaches to the subject.

612 Nuclear Reactor Theory I Fall. 4 credits. 3 lec. Prerequisites: a year of advanced calculus and some nuclear physics.
K. B. Cady.
Physical theory of fission reactors. Fission and neutron interactions with matter; theory of neutron diffusion, slowing down, and thermalization; calculations of criticality and neutron flux distribution in nuclear reactors. Reactor kinetics. At the level of *Nuclear Reactor Theory* by Lamarsh.

613 Nuclear Reactor Theory II Spring. 3 credits. A continuation of A&EP 612, primarily intended for students planning research in nuclear reactor physics and engineering. 3 lec. Prerequisite: A&EP 612.
K. B. Cady.
The Boltzmann linear transport equation, its adjoint, and their approximate solutions are developed and applied to the heterogeneous neutron chain reactor.

615 Membrane Biophysics Spring. 3 credits.
W. W. Webb.
Molecular structure and supramolecular organization of cell membranes. Model membranes and membrane models. Molecular mechanisms of membrane transport, electrophysiology and cell-cell interaction. Physical probes of membrane processes. Dynamics of membrane processes, lateral mobility, diffusion, and flow. Some current problems in cell surface function and organization of specialized membrane macrostructures.

[619 Molecular Energy Transfer Spring. 3 credits. Not offered 1979–80.
T. A. Cool.
Fundamentals of energy transfer by molecular collisions in gases. Energy transfer mechanisms in molecular and chemical lasers. Processes for interconversion of electronic, vibrational, rotational, and translational energy. Intermolecular potential, dispersion forces, multipole moment interactions, repulsive forces.]

622 Electron Optical Instrumentation: Electron and Ion Beam Microprobes and Microscopes Spring. 3 credits.
B. Siegel.
Basic electron optics with emphasis on the principles, design, and characteristics of the components used in probe-forming systems. Special consideration is given to microfabrication by direct electron-beam lithography. The principles and application of analytical electron and ion probe instruments, as well as scanning and fixed-beam electron microscopes, is discussed. Text: Grivet, *Electron Optics*, Vol. 1.

633 Nuclear Reactor Engineering Fall. 4 credits. Prerequisite: introductory course in nuclear engineering.
K. B. Cady.
The fundamentals of nuclear reactor engineering; reactor siting and safety, fluid flow and heat transfer, control, and radiation protection.

634 Nuclear Engineering Design Seminar Spring. 4 credits. Prerequisite: A&EP 633.
K. B. Cady.
A group design study of a selected nuclear system. Emphasis is on safety, siting, and radiation protection in the design of nuclear systems.

636 Seminar on Thermonuclear Fusion Reactors Fall. 3 credits. Prerequisite: basic course in plasma physics or nuclear reactor engineering, or permission of instructor.
Analysis of various technological and engineering problems in design and construction of fusion reactors. Topics include basic reactor schemes, materials, mechanical and heat transfer problems, radiation and safety, superconducting magnets, energy conversion, plasma impurities, and economics.

[638 Intense Pulsed Electron and Ion Beams: Physics and Technology Fall. 2 credits. Prerequisites: Electrical Engineering 681, 682, and A&EP 606, 607; or equivalent; or permission of instructor. Not offered 1979–80.
D. A. Hammer.
Topics include: (1) theoretical aspects of intense electron and ion beams, such as equilibria and stability; (2) technology of intense beam production, such as pulsed-power generator principles, and electron and ion diode operation; and (3) applications of intense beams, such as to controlled fusion, microwave generation, and laser pumping. Extensive discussion of experimental results.]

651 Nuclear Measurements Laboratory Spring. 4 credits. Two 2½-hour afternoon periods plus 1 lec. Prerequisite: some nuclear physics.
Staff.
Lectures on interaction of radiation with matter, radiation biology, and nuclear instruments and measurements. Fifteen experiments are available (from which eight are selected) on nuclear physics, radiation instrumentation and measurements, activation analysis, neutron moderation, and reactor physics and engineering; the subcritical reactor assembly and TRIGA reactor are used. At the level of *Nuclear Radiation Detection* by Price and *Radiation Detection and Measurement* by Knoll.

652 Advanced Nuclear and Reactor Laboratory Spring. 3 credits. Two 2½-hour afternoon periods. Prerequisites: A&EP 651 and 609 or 612. Offered on independent study basis or, with sufficient demand, as a formal course.
Laboratory experiments and experimental methods in nuclear physics and reactor physics. Ten experiments are available, some using the Zero Power Reactor critical facility.

705 Topics in Statistical Physics 3 credits. Prerequisite: general familiarity with statistical mechanics.
M. S. Nelkin.
Selected topics of current interest in statistical physics. For example, in 1976–77 the subject was the variety of anti-intuitive behavior exhibited by nonlinear macroscopic systems driven far from equilibrium; examples were taken primarily from turbulent fluid flow.

711 Principles of Diffraction (also MS&E 610) Fall. 3 credits. Offered alternate years.
B. Batterman.
Introduction to diffraction phenomena as applied to solid-state problems. Scattering and absorption of neutrons, electrons, and x-ray beams. Diffraction from two- and three-dimensional periodic lattices. Fourier representation of scattering centers, and the effect of thermal vibrations. Phonon information from diffuse x-ray and neutron scattering and Bragg reflections. Diffraction from almost-periodic structures, surface layers, gases, and amorphous materials. Survey of dynamical diffraction from perfect and imperfect lattices.

751, 752 Project 751, fall; 752, spring. Credit to be arranged.
Informal study under the direction of a member of the University staff. Students are offered some research experience through work on a special problem related to their field of interest.

753 Seminar Topics in Applied Physics Fall or spring. 1 credit. Primarily for candidates for the M.Eng (Engineering Physics) degree.
The student attends and writes brief summaries on a minimum of thirteen scheduled University seminars and/or colloquia in technical areas close to the student's main interest.

761 Kinetic Theory (also Electrical Engineering 781) Fall. 3 credits. Prerequisites: Physics 561, 562 or permission of instructor. Offered alternate years.
R. L. Liboff.
See Electrical Engineering 781 for course description.

762 Physics of Solid Surfaces (also MS&E 703) Spring. 3 credits. Lecture course primarily for graduate and qualified upperclass students. Prerequisite: MS&E 601 or some knowledge of solid-state physics.
An approach to the physics and chemistry of phenomena in metals, semiconductors, and ionic solids related particularly to surface and interfacial effects. Quantum mechanical and kinetic analyses of the interaction of electrons, ions, and molecules with condensed matter. Application and theory of experimental methods in ultrahigh vacuum physics. Materials drawn from research papers and review articles.

Chemical Engineering

101 Nonresident Lectures Fall. Noncredit. 1 lec.
Given by lecturers invited from industry and from selected departments of the University to assist students in their transition from college to industrial life.

[110 Mass and Energy Balances Spring. 3 credits. Not offered 1979–80. Prerequisites: one year of freshman chemistry and permission of instructor *before course enrollment for the fall term*. Chemical Engineering 110 is intended for students who cannot take the regularly scheduled course.
R. G. Thorpe.
Self-paced audiovisual instruction in the material of Chemical Engineering 111. See description under Division of Basic Studies.]

111 Mass and Energy Balances Fall. 3 credits. 3 lec, 1 computing session. Prerequisite: one year of freshman chemistry or permission of instructor.
R. G. Thorpe.
See description under Division of Basic Studies.

311 Chemical Engineering Thermodynamics I Fall. 3 credits. 3 lec, 1 computing session.
W. B. Streett.
A study of the first and second laws, with application to batch and flow processes. Thermodynamic properties of fluids; applications of thermodynamics to compressors, power cycles, refrigeration; thermodynamic analysis of processes.

312 Chemical Engineering Thermodynamics II Spring. 3 credits. 3 lec, 1 computing session.
M. L. Shuler.
Thermodynamics of mixtures; phase equilibria and phase diagrams. Estimation methods. Heat effects; chemical equilibria.

321 Materials Spring. 4 credits. 3 lec, 1 lab. Prerequisite: MS&E 261 or equivalent, or permission of instructor.
G. G. Cocks.
Practical aspects of materials: extractive metallurgy, forming and fabrication of metals, some useful alloys, ceramic materials, refractories, selection of materials, and behavior of materials under service conditions. Laboratory emphasizes microscopical examination of materials; topics include: optics of the microscope, geometrical and optical crystallography and the physical chemical behavior of materials.

410 Reaction Kinetics and Reactor Design Fall. 3 credits. 3 lec. Prerequisite: Chemical Engineering 430.
R. P. Merrill.
A study of chemical reaction kinetics and principles of reactor design for chemical processes.

421 Industrial Organic Chemical Processes Spring. 2 credits. 2 lec. Prerequisite: Chemistry 253 or 357.
J. C. Smith.
Study of commercial manufacturing processes for important organic chemicals.

430 Introduction to Rate Processes Fall. 3 credits. 3 lec, 1 computing session. Prerequisites: Chemical Engineering 111 and engineering mathematics sequence.
G. F. Scheele, C. Cohen.
Fundamentals of fluid mechanics and heat transfer; solutions to problems involving viscous flow, heat conduction and convection, friction factors and heat transfer coefficients, macroscopic balances, elementary applications.

431 Analysis of Separation Processes Spring. 3 credits. 3 lec, 1 computing session. Prerequisites: Chemical Engineering 430 and familiarity with FORTRAN or PL/I.
R. G. Thorpe.
Analysis of separation processes involving phase equilibria and rate of mass transfer; some use of the digital computer. Phase equilibria; binary, multicomponent, and extractive distillation; liquid-liquid extraction; gas absorption; crystallization.

432 Chemical Engineering Laboratory Fall. 3 credits. 2 lec, 1 lab. Prerequisites: Chemical Engineering 430, 431.
R. L. Von Berg and staff.
Laboratory experiments in fluid dynamics, heat and mass transfer, other operations. Correlation and interpretation of data. Technical report writing.

433 Project Laboratory Fall or spring. Credit variable. Prerequisite: Chemical Engineering 432.
Special laboratory projects involving bench-scale or pilot-plant equipment.

434 Transport Phenomena Spring. 3 credits. 3 lec. Prerequisites: Chemical Engineering 430 and concurrent registration in 431. Strongly recommended for those interested in graduate study in chemical engineering.
W. L. Olbricht, G. F. Scheele.
An introductory treatment of momentum, energy, and mass transport.

461 Chemical Process Evaluation Fall. 3 credits.
P. Harriott.
Study of some important chemical processes, covering raw material sources, analysis of reaction conditions, and product purification.

462 Chemical Process Synthesis Spring. 4 credits. Prerequisite: Chemical Engineering 432.
R. L. Von Berg and staff.
A consideration of process and economic alternatives in selected chemical processes, design and assessment.

563 Process Equipment Design and Selection Fall. 3 credits. 3 lec. Prerequisite: Chemical Engineering 430 and 431 or equivalent.
J. C. Smith.
Performance, selection, and design of process equipment; storing, transporting, mixing, heating, and separating fluids and solids. Process development and design.

564 Design of Chemical Reactors and Multiphase Contacting Systems Spring. 3 credits. 3 lec.
P. Harriott.
Design, scale-up, and optimization of chemical reactors with allowance for heat and mass transfer, nonideal flow, and catalyst aging. Selection of systems for gas-liquid-solid contacting, including stirred tanks, fluidized beds, and fixed beds.

565 Design Project Spring. 3 or 6 credits. Prerequisites: Chemical Engineering 563, 564.
Staff.
Design study and economic evaluation of a chemical processing facility, alternative methods of manufacture, raw material preparation, food processing, waste disposal, or some other aspect of chemical processing.

595, 596 Special Projects in Chemical Engineering Fall or spring. Credit variable.
Research or studies on special problems in chemical engineering.

611 Phase Equilibria Fall. 3 credits. 3 lec. Prerequisite: physical chemistry.
R. G. Thorpe.
A detailed study of the pressure-temperature-composition relations in binary and multicomponent heterogeneous systems where several phases are of variable composition. Prediction of phase data.

621 Petroleum Refining Spring. 3 credits. 3 lec. Prerequisite: Chemical Engineering 430.
H. F. Wiegandt.
A study of processes used to refine petroleum. Recent process developments, including those for selected petrochemicals.

623 Synthetic Fuels Spring. 3 credits.
P. Harriott.
Energy resources and projected consumption. Gasification and liquefaction of coal and oil shale. Synthesis of methane, methanol, and hydrogen. Efficiency and economics of fuel production and use.

627 Nuclear and Reactor Engineering Spring. 2 credits. 2 lec. Prerequisite: permission of instructor.
R. L. Von Berg.
Fuel processing, isotope separation, radioactive waste disposal, radiation damage, shielding, radiation chemistry.

630 Transport Phenomena and Living Systems (also M&AE 560) Spring. 3 credits. Prerequisites: M&AE 221, 323, 324, or equivalent.
R. L. Levin.
See M&AE 560 for course description.

640 Polymeric Materials Fall. 3 credits. 3 lec.
F. Rodriguez.
Chemistry and physics of the formation and characterization of polymers. Principles of fabrication.

641 Physical Polymer Science Spring. 3 credits. 3 lec. Prerequisite: Chemical Engineering 311, 430, physical chemistry or equivalent.
C. Cohen.
Thermodynamic and hydrodynamic properties of polymer solutions. Phase separation in binary and ternary mixtures. Principal characterization techniques. Viscoelastic and transport properties of bulk polymers. Models of the glass transition. Applications to selected polymer processes.

642 Polymeric Materials Laboratory Spring. 2 or 3 credits. 1 or 2 labs. Prerequisite: Chemical Engineering 640.
F. Rodriguez.
Experiments in the formation, characterization, fabrication, and testing of polymers.

644 Microbial Engineering Spring. 3 credits. 2 lec, 1 rec. Prerequisites or corequisites: Chemistry 288 and any course in microbiology.
R. K. Finn.
An advanced discussion of fermentation as a unit process. Topics include sterilization, aeration, agitation, and continuous fermentation.

645 Industrial Microorganisms Fall. 2 credits. Prerequisites: organic chemistry and physical chemistry.
R. K. Finn.
A brief introductory course in microbiology for students with a good background in chemistry.

646 Controlled Cultivation of Microbial Cells Spring. 3 credits. 2 labs. Prerequisites: Chemical Engineering 645 or equivalent and a laboratory course in microbiology. Enrollment limited to chemical engineering students.
R. K. Finn.
Experiments with batch and continuous stirred tanks to explore the physiology of yeasts, molds, and bacteria under conditions simulating industrial practice.

647 Wastewater Engineering in the Process Industries Fall. 3 credits. Prerequisites: organic and physical chemistry; Chemical Engineering 430 or equivalent.
M. L. Shuler.
Introduction to general and legal problems of pollution control; including some descriptive technology. Major emphasis, however, is on the quantitative engineering aspects of design and operation. Both biological and physical chemical methods, as they apply to the treatment of strong and special wastes from the chemical and allied industries, are discussed.

648 Polymer Processes Spring. 3 credits. 3 lec. Prerequisite: 640 or permission of instructor.
F. Rodriguez.
Production and applications of polymers. Discussion of stabilization and degradation, including processes for recycling and disposal of plastics and related products.

651 Numerical Methods in Chemical Engineering Fall. 3 credits. 3 lec.
R. Y. K. Yang.
Solution of single and sets of algebraic equations, polynomial approximations, integration, initial and boundary-value ordinary differential equations, partial differential equations, optimization, statistical design of experiments.

661 Air Pollution Control Fall. 3 credits.
P. Harriott.
Origin of air pollutants, photochemical reactions in the atmosphere. Design of equipment for removal of particulate and gaseous pollutants formed in combustion and chemical processing.

671 Process Control Spring. 2 credits. 1 lec. Prerequisite: Chemical Engineering 430.
M. L. Shuler.
Dynamic responses of processes and design of control schemes that will maintain output specifications in spite of input disturbances.

672 Process Control Laboratory Spring. 1 credit. 1 lab. Prerequisite: concurrent registration in Chemical Engineering 671.
M. L. Shuler.
Experiments on controller calibration, dynamics of pneumatic and electronic analogs of process systems, dynamic responses of first and second order open-loop systems, and control of a heat exchanger.

[673 Applied Surface Chemistry and Physics Spring. 2 credits. Not offered 1979–80.
R. P. Merrill.
Topics in the chemistry and physics of solid surfaces and their applications to applied problems such as catalysis and corrosion. Specific topics differ each year and students may, upon consent of the instructor, take more than one offering of the course.]

680 Chemical Microscopy Fall. 3 credits. 1 lec, 2 labs.
G. G. Cocks.
The use of the light microscope to investigate chemical problems in biological or nonbiological systems. Topics include: the optics of the microscope, types of microscopes (transmission, reflection, polarizing, interference, phase and dark field), the preparation of specimens, qualitative and quantitative analysis, crystallography, and photomicrography.

681 Electron Microscopy Fall. 3 credits. 1 lec, 2 labs. Prerequisite: Chemical Engineering 680 or special permission.
G. G. Cocks.
An introductory course designed to teach the student how to use the electron microscope. Topics include: optics of the microscope, the use and maintenance of the microscope, specimen preparative techniques (substrates, particulates, replication, microtomy, electron diffraction, and thinning of metals), photomicrographic techniques, and the interpretation of micrographs.

682 Advanced Chemical Microscopy Offered on demand either term. Credit variable. Prerequisites: Chemical Engineering 680 and permission of instructor.
G. G. Cocks.
This is primarily a projects course and offers the student the opportunity either to learn more about microscopes and their use or to apply the techniques of microscopy to the investigation of topics or problems of special interest.

683 Laboratory in Optical Crystallography Fall. Credit variable. 2 labs; lec as part of 1 lab. This is the laboratory for Geological Sciences 355, but is open to students who want to take the laboratory only.
G. G. Cocks.
An introduction to geometrical and optical crystallography for mineralogists, with instruction in the use of the polarizing microscope. Topics include the optics of the polarizing microscope, and geometrical and optical crystallography.

692, 693, 694 Research Project Fall or spring. 3 credits; additional credit by special permission. Prerequisite: Chemical Engineering 430.
Research on an original problem in chemical engineering.

711 Advanced Chemical Engineering Thermodynamics Spring. 3 credits. 3 lec. Prerequisite: Chemical Engineering 312 or equivalent.
J. Salacuse.
Application of general thermodynamic methods to advanced problems in chemical engineering. Evaluation, estimation, and correlation of properties; chemical and phase equilibrium.

713 Applied Chemical Kinetics Spring. 3 credits. Prerequisite: physical chemistry.
J. Cocchetto.
Fundamentals of the kinetics of reacting systems. Collision theory, unimolecular rate theory, transition state theory, and the use of simple statistical models to represent reacting chemical systems are stressed. The application of these concepts to nonideal environments, solvent effects, and reactions on solids is presented with emphasis on catalytic phenomena. The physical chemistry of several industrially important reactive systems are discussed as illustrations.

731 Advanced Transport Phenomena Fall. 3 credits. 3 lec. Prerequisite: Chemical Engineering 434 or equivalent.
C. Cohen.
An integrated treatment of momentum, mass, and heat transfer. Molecular transport, the equations of change, viscous laminar flow of Newtonian and non-Newtonian fluids. Solutions of the Navier-Stokes equations for selected steady and unsteady-state problems. Perfect fluid theory and boundary layer theory. Models of mass and heat transfer. Multicomponent diffusion. Simultaneous heat and mass transfer.

[772 Theory of Molecular Liquids Spring. 3 credits. Prerequisite: 711 or equivalent. Not offered 1979–80.
K. E. Gubbins.
Theory of intermolecular forces, and equilibrium statistical mechanics for nonspherical molecules. Distribution functions. Applications to thermodynamics of such fluids using integral equation and perturbation theory techniques. Mixture properties, phase diagrams for mixtures with polar or quadrupolar components. Surface properties.]

790 Seminar Fall and spring. 1 credit each term.
General chemical engineering seminar required of all graduate students majoring in the Field of Chemical Engineering.

792 Advanced Seminar in Thermodynamics Fall or spring. 1 credit.
A forum for talks by graduate students and faculty members on topics of current interest in thermodynamics and statistical mechanics.

891, 892, 893 Thesis Research Fall or spring.
Thesis research for the M.S. degree in chemical engineering.

991, 992, 993, 994, 995 Thesis Research Fall or spring.
Thesis research for the Ph.D. degree in chemical engineering.

Civil and Environmental Engineering

The courses in civil and environmental engineering are listed under the following headings: *Environmental Sensing, Measurement, and Evaluation; Public and Environmental Systems Engineering; Fluid Mechanics and Hydrology; Geotechnical Engineering; Environmental Quality Engineering; Transportation; Structural Engineering; Water Resources Planning and Analysis;* and *Professional Practice.*

A. Environmental Sensing, Measurement, and Evaluation

A321 Engineering Surveying Fall, spring (on demand). 3 credits. 2 lec, 1 lab.
Staff.
Principles and practice of geometric measurements for mapping, boundary surveys, route surveys, and the construction of CEE facilities; and the related topics of photogrammetry, field astronomy, construction and use of topographic maps, introduction to geodesy, and land surveying.

A651 Field Astronomy Fall. 2 credits. Minimum enrollment of six students. 1 lec, 1 lab (including evening observations). Prerequisite: CEE A321 or permission of instructor. May not be offered 1979–80.
G. B. Lyon.
Theory and practice in the determination of latitude and longitude of points and azimuth of lines on the earth by observation of celestial bodies. Topics include: stellar and geographic coordinate systems, use of star catalogs, measurement of time, and pertinent observation and computation procedures.

A652 Geometric Data Adjustments Spring. 3 credits. 3 lec-disc. Prerequisites: Mathematics 293, CEE A321 or A380, and OR&IE 260, or permission of instructor. May not be offered 1979–80.
G. B. Lyon.
Theory and practice of adjustment of geometrically constrained observations with emphasis on surveying applications. Topics include: error theory, minimum variance and other bases for adjustment, and evaluation of precision of results.

A656 Boundary Surveys Spring. 3 credits. 3 lec. Prerequisite: permission of instructor. May not be offered 1979–80.
Legal principles governing location of land boundaries. Historical development and methods of original land surveys. Retracement and restoration of property corners. Coordinate systems; mineral land surveys; riparian and littoral rights; environmental presentations; responsibilities of licensed surveyors.

A661 Photogrammetry Fall. 3 credits. 2 lec, 1 lab. Prerequisite: permission of instructor. May not be offered 1979–80.
Terrestrial, aerial, and space photogrammetry. Photograph geometry: tilt and relief displacements; parallax distortions; control requirements; flight planning. Zeiss Stereometric Camera. Stereo plotting, relative and absolute orientation; Balplex, Wild Autographs, and Terragraph plotters. Geometry of remote sensors.

A662 Analytic Aerotriangulation Spring. 3 credits. 2 lec, 1 lab. Prerequisite: CEE A661. May not be offered 1979–80.
Ground control types and required dispositions. Pyramid, coplanarity, and colinearity solutions for resection and orientation of single photo, stereo-pair, triplet, subblock, and block assemblies. Solutions of large rectangular matrices in photogrammetry. Coordinate transformations.

A671 Geodesy Spring. 3 credits. 3 lec. Prerequisite: permission of instructor. May not be offered 1979–80.
The figure of the earth and the precise determinations of position on or near the earth's surface. Fundamentals of geometric geodesy, physical geodesy, satellite geodesy, and map projections.

A685 Physical Environment Evaluation Fall. 3 credits. 2 lec, 1 lab. Prerequisite: permission of instructor.
T. Liang.
Physical environment factors affecting engineering planning decisions: climate, soil and rock conditions, water resources. Evaluation methods: interpretation of meteorological, topographic, geologic, and soil maps, airphotos, and subsurface exploration records.

A686 Advanced Physical Environment Evaluation Spring. 3 credits. 2 lec, 1 lab. Prerequisite: CEE A685 or A687.
T. Liang.
Study of physical environment using aerial photographs and other remote sensing methods. Conventional photography; spectral, space and sequential photography; thermal and radar imageries. Arctic, tropic, arid, and humid climate regions. Application in projects.

A687 Analyses and Interpretation of Aerial Photographs Fall or spring. 3 credits. 2 lec, 1 lab. Prerequisite: permission of instructor.
Staff.
Identification of a broad spectrum of soils, rocks, and drainage conditions; significance of vegetative and cultural patterns. Specific fields of application are emphasized.

A688 Advanced Interpretation of Aerial Photographs Fall or spring. 3 credits. Prerequisite: CEE A687.
T. Liang.
Lectures and team projects in laboratory and field. Facilities include material for projects in city and regional planning, soil mapping, conservation, ground and surface water, and civil engineering.

A689 Remote Sensing Spring. 3 credits. 2 lec, 1 lab. Prerequisite: permission of instructor.
W. Philipson, T. Liang.
Fundamentals of sensors and sensing in the electromagnetic spectrum. Emphasis is on nonphotographic forms. Coverage includes sensors, sensor and ground data acquisition, data geometry, analysis and interpretation, and mission planning.

A691 Design Project On demand. 1–6 credits. Students may elect to undertake a design project in remote sensing and environment evaluation. The work is supervised by a professor in this subject area.

A692 Research On demand. 1–6 credits.
Staff.
For students who wish to study one particular area in depth. The work may take the form of laboratory investigation, field study, theoretical analysis, or development of design procedures.

A693 Seminar On demand. 1 credit.
Staff.
Presentation and discussion of technical papers and current research in the general field or one of its specialized areas.

A694 Special Topics On demand. 1–6 credits.
Staff.
Supervised study in small groups on one or more special topics not covered in the regular courses. Special topics may be of a theoretical or applied nature.

A696 Seminar in Remote Sensing Fall or spring. 1 credit each term.
W. Philipson, T. Liang.
Presentation and discussion of current research and developments in remote sensing. Lectures by Cornell staff and invited specialists from government and industry.

B. Public and Environmental Systems Engineering

B301 Micro-Economic Analysis (also Economics 311.5) Fall. 4 credits. Prerequisite: one year of college-level mathematics.
R. E. Schuler.
Intermediate microeconomic analysis similar to Economics 311 but emphasizing mathematical techniques. Theory of households, firms, monopoly and competitive markets, distribution and equilibrium, welfare economics. A liberal elective for engineers.

B302 Economic Analysis of Government (also Economics 308) Spring. 4 credits. Prerequisite: one year of college-level mathematics plus CEE B301 or Economics 311.
R. E. Schuler.
Analysis of government intervention in a market economy. Public goods, public finance, cost-benefit analysis, environmental regulation, and macroeconomic topics.

B303 Engineering Economics and Systems Analysis Spring. 3 credits. Aimed at juniors and seniors; not intended for students with substantial background in business economics or methods of operations research.
C. A. Shoemaker.
Intended to give the student a working familiarity with the principles and main analytical techniques for reaching decisions about alternative engineering projects.

B305 Social Implications of Technology Fall. 3 credits. Approved liberal elective. Not open to freshmen.
W. R. Lynn.
Examines selected issues pertaining to the development, implementation, and assessment of technology. Special emphasis is given to social, political, and economic aspects of current problems that have important technological components.

[B416 Seminar in Technology Assessment Spring. 3 credits. Open to graduate students and to upperclass undergraduates with permission of instructor. Not offered 1979–80.
N. Orloff.
An interdisciplinary seminar dealing with the social consequences of technological developments and means by which technology can be guided in socially beneficial directions.]

B614 Legal Methods Spring. 3 credits. Limited to graduate students and to upperclass undergraduates with permission of instructor.
N. Orloff.
An introduction to the structure and operation of our legal system. Development of legal skills and the ability to do one's own basic legal research.

B615 Environmental Law Fall. 4 credits. Limited to graduate students and to upperclass undergraduates with permission of instructor.
N. Orloff.
An introduction to how the legal system handles environmental problems. Study of federal statutes, such as the National Environmental Policy Act, the Clean Air Act, and the Clean Water Act; the regulations issued to implement them; and the important judicial decisions that have been handed down under each.

B617 Public Systems Analysis Fall. 3 credits. Prerequisite: any introductory systems analysis course.
An introduction to the philosophy and applications of systems analysis to public sector problems in transportation, natural resources, public health, global planning, and energy-environmental quality issues.

B693 Environmental and Water Resources Systems Analysis Colloquium Fall or spring. 1 credit.
Staff.
Lectures in various topics related to environmental or water resources systems planning and analysis.

B780 Environmental Control Workshop On demand. 1–3 credits.
W. R. Lynn.
Development of research topics dealing with control of the environment (with special emphasis on biological and ecological aspects). Topics discussed in previous workshops include human population control, control of pest and parasite populations, study of species' strategic use of food supply, control of populations by use of predators, and host-parasite systems. Additional topics are developed.

B791 Environmental and Water Resources Systems Analysis Design Project On demand. Credit variable. Prerequisite: permission of instructor. May extend over two semesters.
Staff.
Design or feasibility study of environmental or water resources systems, supervised and assisted by one or more faculty advisers; individual or group participation. Final report required.

B792 Environmental and Water Resources Systems Analysis Research On demand. Credit variable. Prerequisite: permission of instructor. Preparation must be suitable to the investigation to be undertaken.
Investigations of particular environmental or water resources systems problems.

B794 Special Topics in Environmental or Water Resources Systems Analysis On demand. Credit variable.
Staff.
Supervised study, by individuals or small groups, of one or more specialized topics not covered in regular courses.

C. Fluid Mechanics and Hydrology

C301 Fluid Mechanics I Fall. 4 credits. 3 lec, 1 rec. Prerequisite: T&AM 203 (may be taken concurrently.)
Staff.
Hydrostatics, the basic equations of fluid flow, potential flow and dynamic pressure forces, viscous flow and shear forces, steady pipe flow, turbulence, dimensional analysis, selection of turbomachinery.

C302 Hydraulic Engineering Spring. 3 credits. 2 rec, 1 lab, field trips. Prerequisite: CEE C301.
Staff.
Steady open channel flow, river modeling, unsteady pipe flow, theory of turbomachinery. Laboratory will include a number of experiments in hydraulic and river engineering. Field trips.

[C609 Descriptive Hydrology Spring. 2 credits. Intended for nonengineering majors. Prerequisite: permission of instructor. Not offered 1979–80.
W. H. Brutsaert.
Introduction to hydrology as a description of the hydrologic cycle and the role of water in the natural environment. Topics include precipitation, infiltration, evaporation, ground water, surface runoff, floods, and droughts.]

C615 Fluid Mechanics II Fall. 3 credits. 3 lec. Prerequisite: CEE C301.
Staff.
Introduction to tensor analysis, conservation of mass, momentum and energy from a rigorous point of view. Study of exact solutions of the Navier-Stokes equations. Asymptotic approximations at low and high Reynolds numbers. Similitude and modeling. Laminar diffusion of momentum, mass, and heat.

[C618 Dynamic Oceanography Fall. 3 credits. Prerequisite: CEE C301. Not offered 1979–80.
P. L.-F. Liu.
The statics and dynamics of oceans and lakes. Currents in homogeneous and stratified bodies of water. Tidal motions. Waves in a stratified ocean.]

C620 Analytical Hydrology Fall. 3 credits. Prerequisite: CEE C301.
W. H. Brutsaert.
Physical and statistical analysis related to hydrologic processes. Hydrometeorology and evaporation. Infiltration and base flow. Surface runoff

and channel routing. Linear and nonlinear hydrologic systems analysis. Storage routing and unit hydrograph theory.

C621 Flow in Porous Media and Ground Water Spring. 3 credits. Prerequisite: CEE C301.
W. H. Brutsaert.
Fluid mechanics and equations of single-phase and multiphase flow; methods of solution. Aquifer hydraulics, pumping wells; drought flows; infiltration, ground water recharge; land subsidence; sea-water intrusion, miscible displacement; transient seepage in unsaturated materials.

[C622 Engineering Micrometeorology Spring. 3 credits. 3 lec. Prerequisite: CEE C301. Not offered 1979–80.
W. H. Brutsaert.
Physical processes in the lower atmospheric environment; turbulent transport in the atmospheric boundary layer; surface–air interaction; disturbed boundary layers; radiation. Applications will include sensible and latent heat transfer from lakes; plant canopy flow and evapotranspiration; turbulent diffusion from chimneys and cooling towers; urban climatology; interaction of wind and structures; snow and ice problems.]

C631 Coastal Engineering I Spring. 3 credits. 3 lec. Prerequisite: CEE C301.
P. L.-F. Liu.
Linear wave theory, wave generation by wind, analysis of fluid forces on floating and fixed coastal structures and modification of waves and currents by these structures, coastal processes and coastal sediment motion.

C633 Coastal Engineering II Fall. 3 credits. 3 lec. Prerequisite: CEE C631.
P. L.-F. Liu.
Review of gravity wave theories, applicability of different wave theories to engineering problems, wave energy transmission, tsunamis, boundary value problems in wave hydrodynamics, behavior of submerged and floating bodies, harbor agitations, ship waves.

C641 Environmental Fluid Mechanics I Fall. 3 credits. 3 lec. Prerequisite: CEE C301.
G. H. Jirka.
Introduction to mass and heat transport processes due to pollutant discharges into the environment. Turbulent diffusion equation and its solution for instantaneous and continuous releases. Concept of longitudinal dispersion in shear flow. Applications to pollutant transport prediction in lakes, rivers, estuaries, and coastal zones, as well as the atmosphere. Relative role of hydrodynamic transport to reaction kinetics. Exchange processes for mass and heat at the air-water interface. Convective transport due to density currents. Jet mixing and the design of outfall structures.

C643 Unsteady Hydraulics Spring. 3 credits. Prerequisite: CEE C302 or permission of instructor.
J. A. Liggett.
The physical and mathematical basis for unsteady processes in hydraulic engineering, especially unsteady open channel flow. Water hammer, unsteady sediment transport, long waves on large bodies of water, circulation. Numerical methods of solution.

C651 Environmental Planning and Operation of Energy Facilities Spring. 3 credits. Mixed lecture/seminar format. Prerequisites: CEE C641 or equivalent. Offered alternate years.
G. H. Jirka.
Survey of analytical methodologies for predicting and controlling the environmental impacts of individual energy facilities or of energy systems. Estimation of construction and operating impacts: pollutant sources, models for pollutant dispersal, modeling the relationships of pollutant concentration and ecological, health, and socioeconomic damages. Pollutant abatement strategies and transient releases techniques. Models for regional energy facility siting.

C691 Project On demand. Credit variable. Hours variable. Staff.
The student may elect a design problem or undertake the design and construction of special equipment in the fields of fluid mechanics, hydraulic engineering, or hydrology.

C693 Hydraulics Seminar Spring. 1 credit. Open to undergraduates and graduates and required of graduate students majoring in hydraulics or hydraulic engineering.
Staff.
Topics of current interest in fluid mechanics, hydraulic engineering, and hydrology.

C694 Special Topics in Hydraulics On demand. Credit variable.
Staff.
Special topics in fluid mechanics, hydraulic engineering, or hydrology.

[C742 Environmental Fluid Mechanics II Spring. 3 credits. 3 lec. Prerequisite: CEE C641 or permission of instructor. Offered alternate years. Not offered 1979–80.
G. H. Jirka.
Mechanics of discretely and continuously stratified fluids: internal waves, density currents, blocking, selective withdrawal, and internal jumps. Interfacial stability and mixing. Observed characteristics of turbulent fluid flow in environmental applications, including interaction with buoyancy. Integral techniques for self-similar flows: jets, plumes, and mixing layers. Experimental approaches to environmental fluid problems. Term paper.]

C744 Experimental and Numerical Methods in Hydraulics and Hydrology On demand. 2 credits.
Staff.
Methods used in planning and conducting laboratory and field experiments and in performing numerical analysis. Specific subject matter varies according to the interests of students and staff.

C792 Research in Hydraulics On demand. Credit variable.
Staff.
The student may select an area of investigation in fluid mechanics, hydraulic engineering, or hydrology. The work may be either experimental or theoretical in nature. Results should be submitted to the instructor in charge in the form of a research report.

D. Geotechnical Engineering

D301 Introductory Soil Mechanics Spring. 3 credits. 2 lec, 1 lab/tutorial.
D. A. Sangrey.
Soil as an engineering material. Chemical and physical nature of soil. Engineering properties of soil. Stresses and stress analysis in soil. Introduction to stability, earth pressure, and other design problems. Introduction to laboratory testing.

D606 Foundation Engineering Fall. 3 credits. 3 lec, optional tutorial. Prerequisite: CEE D301.
F. H. Kulhawy.
Soil exploration, sampling, and in-situ testing techniques. Bearing capacity, stress distribution, and settlement. Design of shallow and deep foundations. Compaction and site preparation. Seepage and dewatering of foundation excavations.

D607 Retaining Structures and Slopes Spring. 3 credits. 3 lec, optional tutorial. Prerequisite: CEE D301.
T. D. O'Rourke.
Earth pressure theories. Design of rigid, flexible, braced, tied back, slurry, and reinforced earth walls. Stability of excavation, cut and natural slopes.

D631 Highway Engineering (also Agricultural Engineering 491) Fall. 3 credits. 2 lec, 1 lab. Prerequisite: CEE D301 or permission of instructor.
L. H. Irwin.
See Agricultural Engineering 491 for course description.

D632 Bituminous Materials and Pavement Design (also Agricultural Engineering 492) Spring. 3 credits. 2 lec, 1 lab. Prerequisite: CEE D631 or permission of instructor.
L. H. Irwin.
See Agricultural Engineering 492 for course description.

D691 Design Project in Geotechnical Engineering On demand. 1–6 credits.
Students may elect to undertake a design project in geotechnical engineering. The work is supervised by a professor in this subject area.

D693 Seminar in Geotechnical Engineering Fall or spring.
Staff.
Presentation and discussion of topics of current research and practice in geotechnical engineering.

D694 Special Topics in Geotechnical Engineering On demand. 1–6 credits.
Staff.
Supervised study of special topics not covered in the formal courses.

D710 Engineering Behavior of Soils Fall. 3 credits. 3 lec. Prerequisite: CEE D301. Seniors must have permission of instructor.
D. A. Sangrey.
Detailed study of physicochemical nature of soil. Stress states and stress-strain-time behavior. In-depth evaluation of the strength, compressibility, and permeability of natural soils. Study of special deposits such as sensitive, organic, frozen and man-made soils.

D711 Rock Engineering Fall. 3 credits. 3 lec. Prerequisite: CEE D301 or permission of instructor. Recommended: introductory geology.
F. H. Kulhawy.
Geological and engineering classifications of intact rock, discontinuities, and rock masses. Laboratory and field evaluation of properties. Stress states and stress analysis. Design of foundations on and openings in rock masses. Analysis of the stability of rock slopes.

D712 Graduate Soil Mechanics Laboratory Fall. 3 credits. Prerequisite: CEE D710.
T. D. O'Rourke.
Introductory through advanced techniques for laboratory measurement of soil properties. Emphasis on strength, compressibility, and permeability tests. Critical evaluation of laboratory methodology.

D714 Advanced Foundation Engineering Spring. 3 credits. 3 lec. Prerequisite: CEE D606. May not be offered 1979–80.
T. D. O'Rourke.
A continuation of CEE D606 with detailed emphasis on special topics in soil-structure interaction. Typical topics include: lateral and pullout loading of deep foundations, pile group behavior, foundations for offshore structures, pile-driving dynamics, foundations for special structures.

D715 Soil Dynamics Spring. 3 credits. 3 lec. Prerequisite: permission of instructor.
D. A. Sangrey.
Principles of vibration under harmonic and transient loading. Wave propagation. Dynamic response of soils and its measurement. Analytical models for harmonic, transient, and earthquake loading. Design examples of foundations and embankments.

D717 Embankment Dam Engineering Spring. 2 credits. 2 lec. Prerequisites: CEE D607 and D711, or permission of instructor.
F. H. Kulhawy.
Principles of analysis and design for earth and rockfill dams. Materials, construction methods, internal and external stability, seepage and drainage, performance monitoring, abutment and foundation evaluation. Introduction to tailings dams.

D718 Case Studies in Geotechnical Engineering Spring. 3 credits. Prerequisites: CEE D606 and D607. May not be offered 1979–80.
Staff.
Study of case histories in geotechnical engineering. Critical evaluation of successful and unsuccessful projects. Oral presentations and engineering report evaluation of each case.

D719 Tunnel Engineering Spring. 2 credits. 2 lec. Prerequisites: CEE D607 and D711.
F. H. Kulhawy, T. D. O'Rourke.
Principles of analysis and design for earth and rock tunnels. Materials, construction methods, stability and support systems, deformations, and performance monitoring.

D792 Research and Geotechnical Engineering On demand. 1–6 credits.
Staff.
For the student who wishes to pursue a particular geotechnical topic in considerable depth.

E. Environmental Quality Engineering

E301 Environmental Quality Engineering Spring. 3 credits. Prerequisite: CEE C301.
J. J. Bisogni, J. M. Gossett.
Introduction to the engineering aspects of environmental quality control. Emphasis on water quality control concepts, theory, and methods. Elementary analysis and design applicable to water supply and distribution and to wastewater and storm-water collection systems. Introduction to processes underlying water and wastewater treatment. Effects of wastewater on natural waters.

E604 Assimilation of Pollutants in Natural Waters Fall. 3 credits. 3 lec. Prerequisite: CEE E301 or permission of instructor.
Assimilation and transport of pollutants in the aquatic environment. Emphasis on the physics, chemistry, and biology which form the basis for mathematical description of the assimilation phenomenon in natural waters.

E610 Chemistry of Water and Wastewater Fall. 3 credits. 3 lec-rec. Prerequisite: one year of college chemistry or permission of instructor.
J. M. Gossett.
Principles of physical, organic, inorganic, and biological chemistry applicable to the understanding, design, and control of water and wastewater treatment processes and to reactions in receiving waters.

E611 Aquatic Chemistry Spring. 3 credits. 3 lec. Prerequisite: CEE E610 or Chemistry 287–288.
J. J. Bisogni.
Chemical equilibria in natural aquatic systems, including water and wastewater treatment systems. Chemical thermodynamics, acid-base systems, oxidation-reduction systems, coordination chemistry, solid-liquid-gas interfaces with regard to precipitation, dissolution, and adsorption. Chemical-biological interfaces in natural systems. Emphasis on phenomena, mathematical solution of chemical equilibria, and application to engineering management of water quality.

E630 Solid Waste Management and Resource Recovery Spring. 3 credits. 3 lec-disc. Limited to seniors and graduate students.
C. D. Gates.
Sources, nature, and properties of municipal and industrial solid wastes. Mechanical, biological, and thermal processing methods for disposal of solid wastes and for recovery of material and energy from them.

E633 Environmental Quality Management Fall; spring on demand. 3 credits (4 with approval of instructor). 2 lec-disc. For upperclass or graduate students. May not be offered 1979–80.
L. B. Dworsky.
An introduction to environmental quality management; nature, cause, and control of environmental problems; interaction of physical, social, and cultural environments; emphasis on the interdependent social, economic, development, and environmental issues confronting society.

E634 Air Quality Control Spring. 3 credits. 3 lec-disc. Limited to seniors and graduate students.
C. D. Gates.
An introduction to air quality and air pollution problems. Sources, characteristics, and effects of specific air pollutants; their dispersion and interactions in the atmosphere. Air quality standards and regulations. Air pollution control methods.

E636 Environmental Effects of Energy Conversion Fall. 3 credits. 3 lec-disc. Limited to upperclass and graduate students.
C. D. Gates.
Characteristics of airborne, waterborne, and solid wastes generated in energy-conversion processes. Estimation of the potential impacts of these wastes on the physical environment. Behavior and fate of these wastes in the environment and their effects on receptors. Regulatory and engineering aspects of waste control. Emphasis is on wastes and phenomena related to fossil, nuclear, and refuse-derived fuels.

E638 Sludge Treatment, Utilization, and Disposal Spring. 3 credits. Prerequisites: CEE E301 and E610 or permission of instructor.
R. I. Dick.
An analysis of: the quantity and quality of residues produced from wastewater treatment facilities as a function of process design and operation; the alternatives for reclamation or ultimate disposal of residues with assessment of potential environmental impacts and factors influencing the magnitude of those impacts; the fundamental factors influencing performance of treatment processes for altering sludge properties prior to ultimate disposal; and considerations in selection and integration of sludge management processes to approach optimal design.

E693 Environmental Quality Engineering Seminar Fall or spring. 1 credit. Required of graduate students majoring or minoring in sanitary engineering. Open to undergraduates who have received permission of the instructor.
Presentation and discussion of current topics and problems in sanitary engineering and environmental quality engineering.

E712 Water Chemistry Laboratory Fall. 1 credit. Prerequisites: CEE E610 (students may enroll concurrently in CEE E610) and permission of instructor. Enrollment limited.
J. M. Gossett.
Laboratory methods for analysis of pollutants in water and wastewater.

E715 Chemical and Physical Phenomena and Processes Fall. 4 credits. 3 lec, 1 lab. Prerequisite: CEE E610 or permission of instructor.
J. J. Bisogni.
Theoretical and engineering aspects of chemical and physical phenomena and processes applicable to the removal of impurities from water, wastewater, and industrial wastes, and to their transformation in receiving waters. Analysis and design of treatment processes and systems. Residuals control and treatment. Pertinent laboratory studies.

E716 Biological Phenomena and Processes Spring. 4 credits. 3 lec, 1 lab. Prerequisite: CEE E715 or permission of instructor.
J. M. Gossett.
Theoretical and engineering aspects of biological phenomena and processes applicable to the removal of impurities from water, wastewater, and industrial wastes, and to their transformation in receiving waters. Biokinetic analysis and design of biological treatment process. Pertinent laboratory studies.

E791 Design Project in Sanitary Engineering On demand. Variable credit. Prerequisite: CEE E301 or equivalent.
Staff.
The student will elect or be assigned a problem in the design of water or wastewater treatment processes or plants or wastewater disposal systems; or a laboratory project.

E792 Sanitary Engineering Research On demand. Variable credit. Prerequisites will depend on the particular investigation to be undertaken.
Staff.
For the student who wishes to study a problem in greater depth than is possible in formal courses. Study may be any combination of literature, laboratory, or computational research.

E794 Special Topics in Sanitary Engineering On demand. Credit variable.
Hours variable. Staff.
Supervised study in special topics not covered in formal courses.

F. Transportation

F620 Transportation Engineering Fall. 3 credits.
G. P. Fisher.
Suitable foundation for advanced courses. Introduction to technological, economic, and social aspects of transportation. Quantitative planning and operational models, especially for trip generation, distribution, assignment, and modal choice. Urban transportation; institutional and policy issues; terminals; traffic flow theory; traffic engineering; human factors.

F621 Urban Transportation Planning Fall. 4 credits.
A. H. Meyburg.
The urban transportation problem: its roots, manifestations, and implications; the systems analysis approach to transportation; the demand and supply side of transportation; the urban transportation planning process and its modeling components; generation and evaluation of alternatives. A laboratory period is designed for study-team research.

F623 Travel Demand Theory and Applications Spring, alternate years. 3 credits. Prerequisites: CEE B301 and F621, or permission of instructor.
Advanced instruction in aggregate and disaggregate travel demand modeling. Emphasis is on new techniques and on directions for future research.

F624 Transportation Systems Analysis Spring. 3 credits. Prerequisites: CEE F621, OR&IE 260, and OR&IE 320, or permission of instructor. Offered alternate years.
Application of optimization and simulation techniques in the analysis, planning, and design of transportation facilities for the movement of people and goods. Includes elements of traffic flow theory.

[F640 Traffic Flow Theory Spring. 3 credits. Prerequisites: CEE F621 and OR&IE 260. Not offered 1979–80.
Study of mathematical theories of traffic flow. Microscopic models (car-following models). Macroscopic models (kinematic wave theory). Probability models for traffic lights and optimal control of signalized intersections. Traffic flow on transportation networks. Simulation methods.]

[F641 Airport Planning and Operations Spring. 3 credits. Not offered 1979–80.
A. H. Meyburg.
The role of air travel within the overall transportation system, terminal access, location and site selection, terminal design and operations, metropolitan air transit systems, environmental impact of airport location, air traffic flow analysis, air traffic control, aircraft technology.]

F643 Operations, Design, and Planning of Public Transportation Systems Spring. 3 credits.
A. H. Meyburg.
A study of mass transportation of the past and present, innovative forms of mass and individual transportation in urban areas. The financing and organization of mass transportation; the "free transit" versus fares dilemma. Planning for mass transportation: special applications, implementation of plans, planning transportation in new towns.

F644 Transportation Systems Evaluation Fall. 3 credits. Prerequisite: CEE B301, F621, or equivalent. May not be offered 1979–80.
Economic evaluation of transportation systems and facilities. Basic principles of welfare economics. Elements of cost-benefit analysis applications.

F645 Freight Transportation Spring. 3 credits.
A. H. Meyburg, G. P. Fisher.
Transportation planning methodology for interurban and intraurban freight movements. Relationship to the urban transportation planning process. Problem identification, solution strategies, analysis techniques. Freight demand analysis. Alternative technologies in view of energy, efficiency, and environmental impacts.

F646 Transportation Economics Fall. 3 credits. Prerequisite: CEE B301 or equivalent.
Economic characteristics of alternative modes of transportation and elements of competition among them. Principles of pricing, regulation, and investment. Alternatives for national transportation policy.

F791 Transportation Design Project On demand. Credit variable.
Staff.
Design or feasibility study of transportation systems, supervised by one or more faculty advisers. Individual or group participation.

F792 Transportation Research On demand. Credit variable.
Staff.
In-depth investigation of a particular transportation planning or engineering problem mutually agreed upon between the student and one or more faculty members.

F793 Transportation Colloquium Fall or spring. 1 credit.
Lectures in various topics related to transportation planning and analysis.

F794 Special Topics in Transportation On demand. Credit variable.
Staff.
Individual or small-group study of one or more specialized topics not covered in regular courses.

G. Structural Engineering

G301 Structural Engineering I Fall. 4 credits. 3 lec, one 2-hour lab; evening exams. Prerequisite: T&AM 202.
T. Peköz.
Fundamental concepts of structural engineering. Behavior, analysis, design, structural planning. Loads, structural form, statically determinate analysis, approximate analysis of indeterminate systems. Behavior and design of steel and concrete members.

G302 Structural Engineering II Spring. 4 credits. 3 lec, one 2-hour lab; evening exams. Prerequisite: CEE G301.
A. R. Ingraffea.
Fundamentals of statically indeterminate structures. Moment-area and virtual work methods of displacement computation. Matrix flexibility and stiffness and moment distribution analysis methods. Plastic analysis of steel frames. Computer applications to practical structures.

G303 Structural Engineering III Fall. 4 credits. Evening exams. Prerequisite: CEE G302 or permission of instructor. CEE G351 is also required, but may be taken concurrently.
P. Gergely.
Continues the study of the behavior and design of steel and concrete. Structural elements, connections, and systems.

G304 Structural Engineering IV Spring. 3 credits. Prerequisite: CEE G303.
T. Peköz.
Intended to develop an understanding of the structural design process. Comprehensive design project, drawing on material from previous courses in structures, foundations, and materials.

G305 Structural Behavior Laboratory Spring. 2 credits. Prerequisite (may be taken concurrently instead): CEE G302.
R. N. White.
A lab course on behavior of structures, utilizing small-scale models. Elastic, inelastic, and nonlinear behavior of structural components and systems. Projects.

G351 Engineering Materials Fall. 3 credits. 2 lec, 1 lab.
F. O. Slate.
Engineering properties of concrete, steel, wood, and other structural materials. Design characteristics and significance of test results of materials used in engineering works. Extensive laboratory testing and report writing.

G610 Fundamentals of Structural Mechanics Fall. 3 credits. Prerequisite (may be taken concurrently instead): CEE G303.
J. F. Abel.
Theory of elasticity, energy principles, plate flexure, failure theories, inelastic stress-strain relationships, stress concentration, introduction to fracture, fatigue.

G612 Advanced Structural Analysis Fall. 3 credits. Prerequisites: CEE G302 and computer programming.
A. R. Ingraffea.
Direct stiffness and flexibility methods in matrix formulation, use of standard analysis programs, error detection, substructuring, and special analysis procedures.

G614 Structural Model Analysis and Experimental Methods Fall. 3 credits. 2 lec, 1 lab. May not be offered 1979–80.
R. N. White.
Dimensional analysis and similitude. Model materials, fabrication, loading, and instrumentation techniques. Experimental stress analysis.

G652 Advanced Plain Concrete Spring. 3 credits. 2 lec, conf. Prerequisite: CEE G351 or equivalent.
F. O. Slate.
Topics such as history of cementing materials, air entrainment, light-weight aggregates, petrography, durability, chemical reactions, properties of aggregates, and construction. Relationships among internal structure, physical properties, chemical properties, and mechanical properties.

G653 Structure and Properties of Materials Spring. 3 credits. 2 lec, conferences. Limited to graduate students in engineering or physical sciences, or undergraduates by permission of instructor. Offered alternate years.
F. O. Slate.
Internal structure from amorphous to crystalline state. Forces holding matter together versus forces causing deformation and failure. Correlation of internal structures with physical and mechanical properties. Applications to various engineering materials.

[G654 Low-cost Housing Primarily for Developing Nations Spring. 3 credits. 2 lec, conferences. Offered alternate years. Not offered 1979–80.
F. O. Slate.
A multidisciplinary course. Students study intensively, usually in their own discipline, for a term project, while also being introduced to problems and approaches of other disciplines. Engineers investigate the technological aspects of the subject and other aspects that influence technological decisions, such as cultural and economic factors.]

G655 Low-cost Housing for Developing Nations — Workshop for Physical Planning, Site Selection, and Design Spring. A mixed class of advanced civil engineering and architecture students. Offered alternate years.
F. O. Slate.
Discussions and workshops on physical planning, site selection, choice of materials, and detailed design of individual structures and groupings.

G690 Planning of Structural Systems Fall. 3 credits. Prerequisite: CEE G302.
T. Peköz.
Functional, structural, and other considerations in the planning and selection of structural systems. Preliminary design — estimating overall dimensions and weights, proportioning of members and joints, and optimization. Preliminary analysis of frames, trusses, plates, and shells. Erection, construction, and stress control considerations. Case studies with the participation of practicing engineers.

G693 Structural Engineering Seminar Fall or spring. 1 credit. Limited to qualified seniors and graduate students.
Staff.
Presentation of topics of current interest in the field of structures.

G711 Stability: Theory and Design Spring. 3 credits.
T. Peköz.
Analysis of elastic and plastic stability. Determination of buckling loads and postbuckling behavior of columns. Solid and open web columns with variable cross section. Beam columns. Frame buckling. Torsional-flexural buckling. Lateral buckling of beams. Buckling loads and postbuckling behavior of plates, shear webs, and shells. Critical discussion of current design specification.

G713 Finite Element Analysis Spring. 3 credits. Prerequisite: CEE G610 and G612.
J. F. Abel.
Theoretical and conceptual bases for finite elements in structural mechanics. Development of element relationships and system solution techniques for analysis of bars, beams, planar structures, solids, plates, and shells.

G715 Probabilistic Concepts in Structural Engineering Spring. 3 credits. Prerequisite: CEE G303. Offered alternate years. May not be offered 1979–80.
Probabilistic models, reliability, inference, decision analysis, design codes, second moment approaches.

G716 Prestressed Concrete Structures Fall. 3 credits. 3 lec. Prerequisite: CEE G303. Recommended: CEE G304.
A. H. Nilson.
Behavior, analysis, design of pretensioned and

posttensioned prestressed concrete structures. Partial prestressing. Strength, serviceability, structural efficiency of beams, slabs, tension and compression members, frameworks, bridges.

G717 Advanced Reinforced Concrete Spring. 3 credits. 3 lec. Prerequisite: CEE G303. Recommended: CEE G304.
A. H. Nilson.
Behavior, analysis, design of reinforced concrete structures. Strength, safety, serviceability, structural efficiency. Beams, columns, slabs, frameworks, composite members, ground-supported slabs, shear walls, deep beams, folded plates.

G718 Advanced Design of Metal Structures Fall. 3 credits. Prerequisite: CEE G303.
T. Peköz.
Behavior and design, with emphasis on connections, plate girders, and cold-formed steel structures. Torsion of steel members. Fatigue and fracture.

G719 Advanced Behavior of Metal Structures Spring. 3 credits. Prerequisite: CEE G303.
W. McGuire.
Behavior of beams, beam-columns, and single and multistory frames. Analysis and design of tall building systems. Cable-supported structures.

G720 Shell Theory and Design Spring. 3 credits.
P. Gergely.
Fundamentals of practical shell theory. Differential geometry of surfaces; membrane and bending theory of shells; analysis and design of cylindrical shells, polygonal domes, and paraboloids.

G722 Structural Design for Dynamic Loads Spring. 3 credits.
P. Gergely.
Analysis, design, and behavior of structures subjected to dynamic effects, with emphasis on earthquake-resistant design.

[G732 Optimum Structural Design Fall. 3 credits. Offered alternate years. Not offered 1979–80.
Design of minimum weight or cost structures. Includes fully-stressed design, classical, minimization procedures, and mathematical programming methods.]

[G733 Numerical Methods in Structural Engineering Fall. 3 credits. Prerequisite: CEE G610 and G612. Offered alternate years. Not offered 1979–80.
J. F. Abel.
Numerical techniques for structural and geotechnical engineering, such as residual, variational, finite-difference, and finite-element methods. Selected numerical analysis topics and solution algorithms with emphasis on linear equations and eigenvalue problems.]

G734 Advanced Topics in Finite Element Analysis Fall. 3 credits. Prerequisite: G713. Offered alternate years.
J. F. Abel.
Lectures and colloquia on selected advanced topics and research in progress, including dynamics, nonlinear analysis, shells, fracture mechanics, fluid dynamics, and computer graphics.

G757 Civil and Environmental Engineering Materials Project On demand. 1–3 credits.
F. O. Slate.
Individual projects or reading and study assignments involving engineering materials.

G791 Design Project in Structural Engineering Fall or spring. Credit variable.
Students may elect to undertake a design project in structural engineering. The work is supervised by a professor in this subject area.

G792 Research in Structural Engineering On demand. Credit variable.
Hours variable. Staff.
Pursuit of a branch of structural engineering further than can be done in regular courses. Theoretical or experimental investigation of suitable problems.

G794 Special Topics in Structural Engineering On demand. Credit variable.
Hours variable. Staff.
Individually supervised study or independent design or research in specialized topics not covered in regular courses.

H. Water Resources Planning and Analysis

H615 Water Resources Problems and Policies Fall. 3 credits. Lec-disc. Prerequisite: permission of instructor. Intended primarily for graduate engineering and nonengineering students but open to qualified upperclass students.
L. B. Dworsky.
Historical and contemporary perspectives of water problems, organization, and public policies.

H616 Water Resources Planning Seminar Spring. 3 credits. Prerequisite: CEE H615 or permission of instructor.
L. B. Dworsky.
The concepts, processes, and techniques of regional, multipurpose river-basin planning and development. The case study method is used. Students prepare an integrated, comprehensive report for the study area.

H624 Stochastic Hydrologic Modeling Fall. 3 credits. Prerequisite: OR&IE 260.
J. R. Stedinger.
Develops statistical techniques in time and frequency domain used to analyze and model stochastic processes. Lectures examine Box-Jenkins, fractional-Brownian noise and other streamflow models, drought and flood frequency estimation, parameter estimation in dynamic systems, and analysis of simulation output.

H626 Water Quality Modeling Spring. 3 credits. Prerequisites: Mathematics 294, and CEE B303 or Agricultural Engineering 475.
C. A. Shoemaker, D. A. Haith.
Predictive models of the behavior of biological and chemical substances in bodies of water and in surface runoff. Regional management of water quality.

H628 Water Resources Systems Planning I Fall. 3 credits. Prerequisite: CEE B303 or equivalent.
D. P. Loucks.
Application of deterministic optimization and simulation techniques in water resources planning. River-basin modeling, including irrigation planning and operation, hydropower capacity development, flow augmentation, and flood control and protection.

H629 Water Resource Systems Planning II Spring. 3 credits. Prerequisites: CEE H628 and H624 or permission of instructor.
D. P. Loucks.
Optimization and simulation methods for water resource planning under hydrological, technological, and political uncertainty. Concepts of system reliability, vulnerability, resilience, stability, and robustness.

K. Professional Practice

K301 Numerical Solutions to Civil Engineering Problems Fall. 3 credits.
Introduction to numerical and computer methods through consideration of typical problems drawn from a number of disciplines within civil and environmental engineering. Topics include computer use, computer programming, data handling, numerical analysis, and the role of computing in the civil engineering profession.

K502 Civil and Environmental Engineering Practice On demand. 3 credits. For seniors and graduate students.
Analysis of large engineering works using case studies. Project organization, planning, feasibility, finances. Social and political implications.

K510 Civil and Environmental Engineering Design Project I Fall. 3 credits. Required for students in the M.Eng.(Civil) program.
School faculty and visiting engineers.
Design of major civil engineering project. Planning and preliminary design in fall term; final design in January intersession (CEE K511).

K511 Civil and Environmental Engineering Design Project II Spring (work done during January intersession). 3 credits. Required for students in the M.Eng.(Civil) program. Prerequisite: CEE K510.
School faculty and visiting engineers.
A continuation of CEE K510.

K520–K521 Professional Practice in Engineering Fall and spring. 3 credits each term. Required for and limited to students in the M.Eng. (Civil) program.
W. R. Lynn.
Introduction to nontechnical aspects of engineering practice: legal, financial, social, and ethical aspects; personnel management; communications; professional organizations.

[K531 Engineering Ethics Spring. 3 credits. Limited to candidates for the professional M.Eng. (Civil) degree, and others with permission of instructor. Not offered 1979–80.
Introduction to ethical issues arising in the discharge of the professional engineer's obligations to clients and to the public. Systematic analysis of the implications of these issues in realistic engineering situations. Topics selected from the literature and from the experience of engineers and of students.]

K801 Thesis Fall and spring. 1–12 credits.
A thesis research topic is selected by the student with the advice of the faculty member in charge, and is pursued either independently or in conjunction with others working on the same topic. Registration for credit must be done with the professor at the start of each term.

Computer Science

J. Hartmanis, chairman; R. S. Cartwright, R. L. Constable, R. W. Conway, A. J. Demers, J. E. Donahue, D. J. Gries, J. E. Hopcroft, F. Luk, G. Salton, F. B. Schneider, R. Teitelbaum, C. F. Van Loan

The Department of Computer Science is organized as an intercollege department in the College of Arts and Sciences and the College of Engineering.

100 Introduction to Computer Programming Fall or spring. 3 credits. S-U grades optional. 2 lec, 1 rec (optional, 4 evening exams). Students who contemplate taking both Computer Science 101 and 100 must take 101 first.
An introduction to elementary computer programming concepts. Emphasis is on techniques of problem analysis, algorithm and program development, and program testing. The principal programming language for the course is PL/I; FORTRAN is also introduced and is used for final problems. Normal computer processing is with the IT batch system, but students can elect to use interactive terminals under the SCMS-PL/CT system. The course does not presume any previous programming experience, but a special elective section for the first three weeks

accommodates students with some previous exposure to computing. The course requires no mathematical background; for the last six weeks separate sections are offered for mathematically and nonmathematically-oriented students.

101 The Computer Age Spring. 3 credits. S-U grades optional. 2 lec, 1 rec. Credit will not be granted for both Computer Science 100 and 101 unless 101 is taken first.
Nontechnical introduction to computers and computing. Topics include the history of computation; computer applications in business, medicine, law, education, the humanities, and science; computer music, art, and graphics; the issues of privacy and machine intelligence. Each student has the opportunity to write a term paper about the use of computers in his or her field of study. The rudiments of PL/I are covered, although not in as much depth as in 100. Students write several computer programs and gain experience using various application packages.

102 Introduction to FORTRAN Programming Fall or spring (weeks 1 to 5 only). 1 credit. S-U grades optional. Credit will not be granted for both Computer Science 100 and 102 unless 102 is taken first.
Elementary programming concepts. Laboratory problems using FORTRAN IV language.

103 Introduction to PASCAL Fall or spring (weeks 6 to 9 only). 1 credit. S-U grades optional.
Prerequisite: Computer Science 100 or equivalent programming experience.
Variables; data types and type definitions; scalar, set, array, and record types; language constructs for systematic programming; files; procedures and functions. Several programming assignments.

104 Introduction to APL Programming Fall or spring (weeks 2 to 5 only). 1 credit. S-U grades optional. Prerequisite: Computer Science 100 or equivalent programming experience.
Introduction to interactive terminal computing using the APL language.

107 Introduction to Interactive Computing with CMS Fall or spring (weeks 2 to 5 only). 1 credit. S-U grades only. Prerequisite: Computer Science 100 or equivalent programming experience.
Concepts of interactive computing, using the editor, data management, utility commands, remote job submission, interactive language processors, and the EXEC facility.

108 Introduction to Statistical Packages Fall or spring (weeks 10 to 13 only). 1 credit. S-U grades only.
Discussion of the wide range of procedures and data transformation facilities provided by statistical program packages. Topics covered include data preparation and formatting, program control cards, JCL, and hints for debugging.

109 Multistep Job Processing and JCL Fall or spring (weeks 6 to 9 only). 1 credit. S-U grades only. Prerequisite: Computer Science 100 or equivalent programming experience.
Outline of HASP and OS systems currently implemented. Topics include job control language for using tapes, disks, catalogued procedures and symbolic parameters, and HASP commands for special processing.

211 Computers and Programming Fall or spring. 3 credits. 2 lec, 1 lab, 2 evening quizzes (Oct. 9, Nov. 15; Feb. 26, April 10). Prerequisite: Computer Science 100 or equivalent programming experience.
Intermediate programming in PL/I: procedures, block structures, on conditions, recursion. Introduction to data structures and program analysis and simulation. Programming assignments for a variety of applications.

280 Discrete Structures Fall. 4 credits. 3 lec. Prerequisite: Computer Science 211 or permission of instructor.
Mathematical aspects of programming and computing. Induction, logical proof, and discrete structures used in programs. Introducing recursive functions, relations, homomorphisms, partially ordered sets, the predicate calculus, and concepts from automata and computability theory.

305 Computers and Society Fall. 3 credits. 2 lec-seminars. Prerequisite: Computer Science 100 or 101 or permission of instructor.
The economic, political, and cultural impact of computers and computer-related technology. The cashless society, systems approach to social problems, law enforcement, political campaigns, data banks and privacy, education, machine creativity, and machine intelligence.

314 Introduction to Computer Systems and Organization Fall or spring. 4 credits. 2 lec, 1 lab. Prerequisite: Computer Science 211 or equivalent.
Logical structure of digital computers: representation of information, addressing mechanisms, storage and peripheral hardware, the input-output channel.

321–322 Introduction to Numerical Analysis 321, fall; 322, spring. 4 credits each term. 3 lec. Prerequisites for Computer Science 321: Mathematics 293 or 221 and knowledge of a programming language such as FORTRAN or PL/I. Additional prerequisite for Computer Science 322: Mathematics 294 or 222.
Students solve representative problems by programming appropriate algorithms and using library programs. Numerical methods for systems of linear equations, integration, eigenvalues, spline, interpolation, differentiation, least squares. Numerical solution of differential equations and nonlinear equations in several variables.

410 Data Structures Fall. 4 credits. 2 lec. Prerequisite or corequisite: Computer Science 314.
Lists, trees, graphs, arrays, and other forms of data structure and their implementation. Relation between language and data structure (e.g., introduction to LISP). Dynamic storage allocation and memory management. Searching and sorting methods.

414 Systems Programming and Operating Systems Spring. 4 credits. 3 lec. Prerequisite: Computer Science 314 or permission of instructor.
The logical design of systems programs with emphasis on multiprogrammed operating systems. Input-output methods, process synchronization, memory management, sharing, file systems. Case studies. Project to implement a small system.

417 Computer Graphics (also Architecture 334) Fall. 3 credits. Prerequisites: two terms of calculus and Computer Science 211, or equivalents.
Introduction to the principles of interactive computer graphics, including input techniques, display devices, display files, interactive graphic techniques, two- and three-dimensional computer graphics, perspective transformations, hidden line and hidden surface algorithms, and color picture generations.

432 Introduction to Simulation and Database Systems (also OR&IE 383) Spring. 4 credits. 2 lec, 1 rec. Prerequisite: Computer Science 211. Students who wish to take only the second half of this course should register in Computer Science 434.
First half of course is concerned with discrete-event simulation: problems of modeling, programming, and experimental investigation. Balance of course is introduction to modern database systems: basic models of file organization and access strategies, and problems of file maintenance and information retrieval. Both sections involve substantial programming exercises.

434 Introduction to Database Systems Spring. 2 credits. 2 lec, 1 rec. Prerequisite: Computer Science 211 or equivalent (weeks 7 to 14 only). Students who wish to take only the database portion of Computer Science 432 register in Computer Science 434.
For course description, see above.

481–482 Introduction to Theory of Computing I and II 481, fall; 482, spring. 4 credits each term. 3 lec. Prerequisites: Computer Science 211 and 280 or equivalent mathematics, or permission of instructor.
Introduction to modern theory of computing. Covers automata theory, formal languages, effective computability, computational complexity, analysis of algorithms.

490 Independent Reading and Research Fall or spring. 1–4 credits.
Independent reading and research for undergraduates.

600 Computer Science and Programming Fall. 1 credit. Prerequisite: graduate standing in computer science or permission of instructor.
Introduction to practical, modern ideas in programming methodology. Covers style and organization of programs, basic techniques for presenting proofs of correctness of programs, the use of a "calculus" for the derivation of programs, analysis of the computational complexity of programs, and related topics.

611 Advanced Programming Languages Fall. 4 credits. 3 lec. Prerequisite: Computer Science 410 or equivalent.
Formal specification of programming languages, including LISP, ALGOL 60, and PL/I. Principles of structure and design and recent developments in programming languages, including ALGOL 68. Introduction to program schemata and semantics and their application in classifying and comparing programming languages.

612 Translator Writing Spring. 4 credits. 3 lec. Prerequisite: Computer Science 410 and 481 or permission of instructor.
Discussion of the models and techniques used in the design and implementation of compilers. Topics include lexical analysis in translators, compilation of arithmetic expressions and simple statements, specifications of syntax, algorithms for syntactic analysis, code generation and optimization techniques, bootstrapping methods, translator writing systems.

613 Operating Systems Principles Fall. 4 credits. 3 lec. Prerequisites: Computer Science 410 and 414 or permission of instructor.
Advanced techniques and models of concurrent systems. Synchronization of concurrent processes. Parallel programming languages. Deadlock. Verification. Models of paging algorithms and program behavior. Protection and security.

[615 Machine Organization Spring. 4 credits. 3 lec. Prerequisite: Computer Science 314 or permission of instructor. Not offered 1979–80.]

[618 Picture Processing Spring. 4 credits. 3 lec. Prerequisite: Computer Science 611 or permission of instructor. Not offered 1979–80.]

621–622 Numerical Analysis 621, fall; 622, spring. 4 credits each term. 3 lec. Prerequisites: Mathematics 411 and knowledge of a programming language such as FORTRAN or PL/I.
This course is the same as 321–322 except that the analysis of the algorithms is at a mathematically deeper level.

632 Analysis of Database Systems Fall. 4 credits. 2 lec. Prerequisites: Computer Science 410 and either 432 or permission of instructor.

Review of hierarchical, network, and relational database models. Principal data-base systems and query languages. Hardware for data-base processing. Implementation and optimization questions. Data integrity and protection for distributed systems. Relational database theory.

635 Information Organization and Retrieval Spring. 4 credits. 2 lec. Prerequisite: Computer Science 410 or equivalent.
Introduction to information retrieval. File organization and search algorithms. Statistical analysis and automatic classification of information. Structural language analysis. Dictionary techniques. Interactive retrieval. Questioning and answering and database retrieval. Evaluation of retrieval effectiveness.

681 Theory of Algorithms and Computing I Fall. 4 credits. 3 lec. Prerequisite: Computer Science 482 or permission of instructor.
Computational models, measures of complexity, analysis of algorithms, arithmetic complexity, lower bounds, reducibilities, polynomial complete problems.

682 Theory of Algorithms and Computing II Spring. 4 credits. 3 lec. Prerequisite: Computer Science 481 or permission of instructor.
Advanced treatment of theory of computation, computational complexity theory, and other topics in computing theory.

709 Computer Science Graduate Seminar Fall or spring. 1 credit. 1 seminar. For graduate students interested in computer science.
Staff, visitors, and students.
A weekly meeting for the discussion and study of important topics in the field.

[711 Theory of Programming Languages Spring. 4 credits. 2 lec. Prerequisites: Computer Science 611 and 481. Offered alternate years. Not offered 1979–80.
Advanced topics in formal semantics. Topics may include mathematical semantics, program verification systems, application of formal semantics to language design, variable-free languages, correctness of implementations.]

712 Theoretical Aspects of Compiler Construction Spring. 4 credits. 2 lec. Prerequisites: Computer Science 612 and 481. Offered alternate years.
Formal methods of syntactic analysis, including precedence, bounded context, and LR techniques. General parsing methods and their time-spaced complexity. Noncanonical parsing techniques. Formal methods of object code optimization.

713 Seminar in Operating Systems Fall or spring. 4 credits. 1 seminar. Prerequisite: Computer Science 613 or permission of instructor.
Discussion of contemporary issues in operating systems.

719 Seminar in Programming Fall or spring. 4 credits. 1 seminar. Prerequisite: Computer Science 611 or permission of instructor.

[721 Solutions of Nonlinear Equations and Nonlinear Optimization Problems Fall. 4 credits. Prerequisite: Computer Science 622 or permission of instructor. Not offered 1979–80.
Emphasis on the rigorous analysis of practical numerical algorithms for nonlinear problems. Sample topics are: nonlinear functional analysis, constrained and unconstrained minimization, and computationally convenient modifications of Newton's method, including quasi-Newton and penalty function methods and nonlinear least squares.]

[723 Numerical Solution of Ordinary Differential Equations and Integral Equations Fall. 4 credits. Prerequisite: Computer Science 622 or permission of instructor. Not offered 1979–80.]

[725 Numerical Solution of Partial Differential Equations Spring. 4 credits. Prerequisite: Computer Science 622 or permission of instructor. Hours to be arranged. Not offered 1979–80.
General classification, solution by method of characteristics, finite-difference methods for hyperbolic and elliptic equations, parabolic equations in two dimensions, direct solution of elliptic finite-difference equations, iterative methods for the solution of elliptic equations, block methods for large systems, singularities in elliptic equations, stability in relation to initial value problems, and nonlinear discretization algorithms.]

727 Matrix Computations Fall. 4 credits. Prerequisite: Computer Science 621 or permission of instructor.
Algorithms for special linear systems, least squares, and generalized eigenvalue problems. Iterative and Lanczos techniques for sparse versions of these problems. Applications in statistics and control theory are discussed.

729 Seminar in Numerical Analysis Fall or spring. 4 credits. Prerequisite: permission of instructor.

[733 Selected Topics in Information Processing (also OR&IE 789) Not offered 1979–80.]

734 Seminar in File Processing Fall. Credit and hours to be arranged. Prerequisite: Computer Science 733.

739 Seminar in Information Organization and Retrieval Fall or spring. 4 credits. Prerequisite: Computer Science 635.

[781 Advanced Theory of Computing Fall. Alternates with Computer Science 782. 4 credits. Prerequisites: Computer Science 681 and 682, or permission of instructor. Not offered 1979–80.
At instructor's discretion, advanced topics, possibly including automata, computability, computational complexity, program schemata, semantics, and analysis of algorithms.]

782 Advanced Theory of Computing Spring. Alternates with Computer Science 781. 4 credits.

789 Seminar in Automata Theory Fall or spring. 4 credits. 1 seminar. Prerequisite: permission of instructor.

790 Special Investigations in Computer Science Fall or spring. Prerequisite: permission of a computer science adviser.
Independent research.

890 Special Investigations in Computer Science Fall or spring. Prerequisite: permission of a computer science adviser.
Master's degree research.

990 Special Investigations in Computer Science Fall or spring. Prerequisite: permission of a computer science adviser.
Doctoral research.

Electrical Engineering

210 Introduction to Electrical Systems Fall or spring. 3 credits. 3 lec-rec. Prerequisites: Mathematics 192 and Physics 112.
An engineering core science. See description under Division of Basic Studies.

230 Introduction to Digital Systems Fall or spring. 3 credits. 2 lec, 5 lab experiments.
An engineering core science. See description under Division of Basic Studies.

301 Electrical Signals and Systems I Fall. 4 credits. 3 lec, 1 rec-computing session. Prerequisites: Electrical Engineering 210 and Mathematics 294 or equivalents.
Formulation of circuit equations, steady-state response, Laplace transform and applications, system functions. State description of linear systems. Natural modes, initial conditions, forced response. Two-port circuit descriptions. Models for active circuits.

302 Electrical Signals and Systems II Spring. 4 credits. 3 lec, 1 rec-computing session. Prerequisite: Electrical Engineering 301.
Single-sided and bilateral Laplace transforms. Applications of complex functions and contour integration to system response. Stability criteria. Transmission line transients. Fourier series and integrals. Discrete and Fast Fourier transforms. Sampling.

303 Electromagnetic Theory I Fall. 4 credits. 3 lec, 1 rec-computing session. Prerequisites: Physics 214 and Mathematics 294.
Foundation of electromagnetic theory. Topics include Maxwell's equations; boundary conditions and the Laplace equation; plane waves, wave propagation and reflection at boundaries, the Poynting theorem; guided TEM, TM, and TE waves, impedance transformation. Introduction to simple antenna systems.

304 Electromagnetic Theory II Spring. 4 credits. 3 lec, 1 rec-computing session. Prerequisites: Electrical Engineering 301 and 303.
Fundamentals of electromagnetic theory with emphasis on wave propagation and guidance, radiating systems, and the effects of the medium on transmission. Topics include retarded potentials; relation of radiation fields to source distributions, antenna gain concepts and techniques in antenna design; wave guide systems, separation of variables, cavities, and losses; propagation in inhomogeneous and anisotropic media; complex permittivity, plasma and magnetic field effects.

306 Fundamentals of Quantum and Solid-State Electronics Spring. 4 credits. 3 lec, 1 rec-computing session. Prerequisites: Physics 234, Mathematics 294, and coregistration in 303.
Introductory quantum mechanics and solid-state physics necessary for understanding lasers and modern solid-state electronic devices. Quantum mechanics is presented in terms of wave functions, operators, and solutions of Schroedinger's equation. Topics include tunneling, atomic structure and the periodic table, electron statistics, and the physics underlying energy bands in solids. Applications will emphasize p-n junctions, solid-state diodes, and other devices.

310 Probability and Random Signals Spring. 4 credits. 3 lec, 1 rec-computing session.
Introduction to modeling random phenomena and signals and applications of these models. Topics include: concepts of probability, conditional probability, independence, random variables, expectation and random processes. Applications to problems of inference, estimation, and linear system response in communications, computers, control, and pattern classification.

315 Electrical Laboratory I Fall. 4 credits. 2 lec, 2 labs. Prerequisites: Electrical Engineering 210 and coregistration 301.
Basic electrical and electronic instrumentation and measurements involving circuits and fields of both active and passive elements; an experimental introduction to solid-state theory and devices.

316 Electrical Laboratory II Spring. 4 credits. 2 lec, 2 labs. Prerequisites: Electrical Engineering 303 and 315.
Laboratory studies of solid-state phenomena and

devices; experiments illustrating the use of the digital computer in electrical engineering; laboratory studies of high-frequency phenomena and devices; an introduction to ac and dc machinery.

407 Quantum Mechanics and Applications Fall. 4 credits. 3 lec, 1 rec-computing session. Prerequisite: Electrical Engineering 306.
A continuation of the presentation of quantum mechanical theory. Topics include the solution to the harmonic oscillator with application to molecular structure and phonons, addition of angular momentum and multiplet structure, the effect of electric and magnetic fields on atoms, time-independent and time-dependent perturbation theory. Applications include electrons in a periodic structure, vibrational modes of a crystal, emission and absorption of radiation.

430 Introduction to Lasers and Optical Electronics Spring. 4 credits. 2 lec, 1 lec-rec, 1 lab. Prerequisite: Electrical Engineering 306 or equivalent (such as Physics 443).
G. J. Wolga.
An introduction to stimulated emission devices such as masers, lasers, and optical devices based on linear and nonlinear responses to coherent fields. Material discussed, based on quantum mechanical results, employs phenomenological theories and stresses applications to modern devices. Discussions of applications include the operating principles of a variety of important lasers, crystal optics with application to electro-optic and acousto-optic modulators, and an introduction to integrated optics. Labs present an opportunity to work with a variety of the lasers discussed in lectures.

480 Thermal and Statistical Physics for Engineers Fall. 3 credits. Prerequisite: Physics 214.
R. Liboff.
Thermodynamic principles. Elementary theory of transport coefficients. Electrical noise. Quantum and classical statistics. Black body radiation. Thermal properties of solids. Elementary descriptions of the p-n junction, shock waves, superfluidity, superconductivity, and the laser.

531–532 Electronic Circuit Design 531, fall; 532, spring. Fall, 4 credits; spring, 3 or 4 credits. 3 lec, 1 optional lab. Prerequisites: Electrical Engineering 230 and 316.
N. H. Bryant.
Design techniques for circuits used in electronic instrumentation. A variety of circuits that employ discrete components, operational amplifiers, I-C timers, and logic circuitry are considered. Emphasis is placed on designing for specified function rather than on detailed analyses. At the level of *Electronics for Scientists* by Malmstadt et al.

[551 Electrical Machinery Fall. 3 credits. 2 lec, 1 lab-computing session. Prerequisite: staff permission. Not offered 1979–80.
Theory, analysis, characteristics, operation, and applications of polyphase synchronous and asynchronous machines. Single-phase motors. Selsyn and other specialized machines.]

[581 Wave Phenomena in the Atmosphere Fall. 3 credits. 3 lec-rec. Prerequisites: Electrical Engineering 301 and 304. Not offered 1979–80.
An elementary treatment of wave phenomena in the atmosphere of the earth, including gravity waves, planetary waves, acoustic waves, radiowaves, and plasma waves; attention is directed to the role of these phenomena in various atmospheric processes and engineering processes such as weather, diffusive transport, air-sea interaction, radio communication, and remote sensing.]

591–592 Senior Project 591, fall; 592, spring. 3 credits.
Individual study, analysis, and, usually, experimental tests in connection with a special engineering problem chosen by the student after consultation with the faculty member directing the project. An engineering report on the project is required.

621 Bioinstrumentation Fall. 3 credits (4 with lab). Prerequisites: Electrical Engineering 301 and 316. 3 lec, 1 lab.
W. J. Heetderks.
The acquisition and processing of biological signals. Topics include electrodes, ion selective electrodes, temperature transducers, pressure transducers, flow transducers, force transducers, displacement transducers, operational amplifiers, instrumentation amplifiers, analog signal processing, D/A and A/D conversion, and digital processing with minicomputers and microprocessors.

622 Bioelectric Systems (also Biological Sciences 696) Spring. 3 credits (optional 1-credit lab by permission). 3 lec. Prerequisite: Electrical Engineering 301, 621, or Biological Sciences 397 or 423.
M. Kim, R. Capranica.
Application of electrical systems techniques to biological problems. Electrical activity of nerve cells; generation and propagation of nerve impulse; voltage clamp technique and its use in phase-plane analysis; neuromuscular systems; synaptic transmission; models of nerve cell, sensory receptors, and encoding in nervous system; analysis of electrophysiological data; electrodes and instrumentation techniques.

623 Active and Digital Network Design Fall. 3 or 4 credits (4 credits with lab). 3 lec, 1 lab. Prerequisite: Electrical Engineering 301.
W. H. Ku.
Design of passive filters and matching networks. Active filter design using operational amplifiers. Design of transistor amplifiers. Digital signal processing. Z-transform and discrete Fourier transform (DFT). Design of nonrecursive and recursive digital filters. Fast Fourier transform (FFT) algorithms.

624 Computer Methods in Electrical Engineering Spring. 4 credits. Prerequisite: Electrical Engineering 301.
Modern techniques for solving electrical engineering problems on the digital computer. Emphasis on efficiency and numerical stability rather than on theoretical implications. Solution of linear and nonlinear algebraic equations; integration; solution of ordinary differential equations; random number generators. Applications to power systems, control systems, communication systems, and circuit design.

[627 Fundamentals of Linear Networks Fall. 4 credits. 3 lec. Prerequisite: Electrical Engineering 302. Not offered 1979–80.
Scattering and generalized network formalisms with applications. Nonreciprocal and active network properties. Applications of Tellegen's theorem. Passive and active network invariants applied to gain and stability problems.]

[628 Network Theory and Applications Spring. 4 credits. 3 lec. Prerequisite: Electrical Engineering 302. Not offered 1979–80.
Circuit properties in complex frequency domain. Realizability theory. Insertion loss design of lumped and microwave filters, equalizers, and linear phase structures. Gain bandwidth theory for broadband matching and wideband amplifiers.]

630 Physical Electronics of Solids Fall. 4 credits. 3 lec, 1 rec. Prerequisites: Electrical Engineering 306 and 304 or 407 or consent of instructor.
Topics include crystal symmetry and effects on device processing and operation; lattice vibrations; energy bands and their effects on device design and operation; hot-electron effects; transport of electrons and holes; optical properties; magnetic properties. These topics are discussed in terms of their influence on the operation of solar cells, photocathodes, microwave semiconductor devices, junction lasers and LEDs, and bubble and charge-control memories.

631–632 Semiconductor Electronics I and II 631, fall; 632, spring. 631: 4 credits; 3 lec, 1 lab. 632: 3 or 4 credits; 3 lec, optional lab. Prerequisite: Electrical Engineering 306 and 316.
N. H. Bryant.
Properties of semiconductors, theory of P-N junction, practical P-N diodes, metal-semiconductor contacts, diode switching, characteristics and application of bipolar junction transistors, circuit models for BJT's, MOS and junction field-effect transistors, four-layer devices and applications. At the level of *Semiconductor Electronics* by Ankrum.

633 Solid-State Microwave Devices and Subsystems I Fall. 3 credits. 2 lec, 1 lab. Prerequisite: Electrical Engineering 304.
Theoretical and experimental studies of circuits, amplifiers, oscillators, detectors, receivers, and electrical noise at microwave frequencies. Typical topics: one- and two-port resonators; negative resistance amplifiers; oscillator load characteristics, locking and stabilization; microwave transistor amplifiers; intermodulation effects; resistor and shot noise; noise temperature, fm noise.

634 Solid-State Microwave Devices and Subsystems II Spring. 3 credits. 2 lec, 1 lab. Prerequisite: Electrical Engineering 633.
Basic theories of solid-state devices at microwave frequencies. Specific devices studied: varactors, avalanche diodes; transferred electron diodes; pnp oscillator diodes; tunnel diodes; pin diodes; and microwave transistors. Studies of experimental methods of characterizing these devices include use of H.P. network analyzer and other microwave equipment.

636 Integrated Circuit Technology Spring. 3 credits. 2 lec, 1 lab. Prerequisite: 631 or permission of instructor.
Integrated circuit fabrication techniques applicable in the fields of computer hardware, telecommunication systems, and optoelectronics, with emphasis on device technology. Diffusion, oxidation, ion implantation; limits on device performance and device design, both MOS and bipolar. Compound semiconductors. At the level of current papers in *IEEE Transactions on Electron Devices*.

651–652 Electric Energy Systems I and II 651, fall; 652, spring. 4 credits each term. 3 lec-rec, 1 lab-computing session. Prerequisite for 651: Electrical Engineering 316 or permission of instructor.
S. Linke.
Engineering principles underlying operation of modern electric power systems under steady-state and transient conditions emphasizing major power-system parameters. Digital computer used as dynamic "laboratory" model of complex power systems for load-flow, fault, stability, and economic-dispatch studies. At the level of *Elements of Power System Analysis* (Third ed.) by Stevenson.

655 Advanced Power Systems Analysis I Fall. 3 credits. Prerequisite: Electrical Engineering 302 and concurrent registration in 651, or permission of instructor.
S. Linke.
Analysis of power-system components. These components include rotating machines, and systems for excitation control, automatic voltage regulation, boiler-turbine control, and speed regulation as well as ancillary three-phase networks. Emphasis on derivation of mathematical models from first principles; development of algorithms for the formation of applicable network matrices.

656 Advanced Power Systems Analysis II Spring. 3 credits. Prerequisites: Electrical Engineering 655 and concurrent registration in 652 or permission of instructor.
J. S. Thorp, C. Pottle.
Computer methods in power systems applied to short-circuit studies, load-flow studies, transient-stability studies, economic dispatch, and security load flows. Use of sparse-matrix techniques. Comparison of algorithms for digital relaying. State-estimation algorithms. Emphasis on the use of the digital computer in the planning and operation of large-scale power systems. At the level of *Computer Methods in Power System Analysis* by Stagg and El-Abiad.

661 Error Control Codes Fall. 3 or 4 credits (4 with lab). 3 lec, 1 lab. Lab prerequisite: FORTRAN or PL/I.
Development of codes for correction or detection of errors in digital data transmission, encoding and decoding algorithms and their implementation using feedback shift register circuits or computer programs. The underlying algebraic theory (groups, Galois fields) is developed from the beginning as needed. The codes studied include hamming codes, cyclic codes, BCH codes, Reed-Solomon codes, convolutional tree codes, and burst-correcting codes. Lab consists of computer implementation of algorithms covered in lecture.

662 Fundamental Information Theory Spring. 3 or 4 credits (4 with lab). 3 lec, 1 lab. Prerequisite: Electrical Engineering 310 or equivalent. Prerequisite for lab only: Electrical Engineering 661 with lab.
Fundamental results of information theory with application to storage, compression, and transmission of data. Entropy and other information measures. Block and variable-length codes. Channel capacity and rate-distortion functions. Coding theorems and converses for classical and multiterminal configurations. Gaussian sources and channels. Lab projects investigate problems of statistical characterization of sourses and channels using computer simulation, and evaluate the coding algorithms introduced in 661.

664 Decision Making and Estimation Fall. 4 credits. Prerequisite: Electrical Engineering 310 or equivalent.
Concepts and key results of decision and estimation are developed and applied to problems arising in pattern classification and communications. The design philosophies discussed include those of minimum expected loss, Neyman-Pearson, and minimax risk/regret. Lab projects, if elected, involve the computer-based design and simulation of a pattern classifier.

667 Communication Systems I Fall. 4 credits. 2 lec, 1 rec. Prerequisite: Electrical Engineering 310 or equivalent.
Analog and digital signal representation, spectral analysis, linear signal processing, modulation and demodulation systems. Time and frequency division multiplex systems. Introduction to random processes and noise in analog and digital systems.

668 Communication Systems II Spring. 4 credits. 3 lec, 1 rec. Prerequisite: Electrical Engineering 667 or equivalent.
Analysis of analog and digital communication systems in the presence of random signal and noise. System optimization, matched filters, linear smoothing, and prediction of stationary processes. Signal extraction in the presence of additive noise. Signal design for digital transmission. Signal detection in radar and digital communications. Selected topics in hypothesis testing and parameter estimation applied to receiver design.

671–672 Feedback Control Systems 671, fall; 672, spring. 3 credits each term (4 with lab). Prerequisite: Electrical Engineering 302 or permission of instructor.
System performance specifications. Analysis of linear feedback control systems by root locus and frequency response methods. Classical cascade and feedback compensation techniques. State space approach; controllability, observability, infinite-interval optimal-control problem, parameter optimization, state variable feedback. Nonlinear feedback systems; stability by Nyquist, Lyapunov, and Popov conditions. Limit cycle behavior by describing function techniques. Sampled-data systems and digital compensation. Laboratory work consists of familiarization with system frequency response measurements, transfer function measurements, and transient response measurements; also, design and compensation of linear positional and speed control systems, analysis of nonlinear systems and sampled-data systems. Emphasis is on correlation of theoretical and experimental results.

675 Computer Structures Fall. 3 credits (4 with lab). Prerequisite: Electrical Engineering 230 or Computer Science 314; Electrical Engineering 230 is prerequisite for lab in 675.
H. C. Torng.
Organization and design of digital computers, arithmetic hardware, I/O systems. Three laboratory groups combine efforts to design and build a digital computer.

676 Microprocessor Systems Spring. 3 credits (4 with lab). Prerequisite: Electrical Engineering 675; lab in 675 is prerequisite for lab in 676.
N. M. Vrana.
System design using microprocessors. Hardware and software techniques employed for logic design, interfacing, instrumentation, and control.

677 Computer Processor Organization and Memory Hierarchy Fall. 4 credits. Prerequisites: Electrical Engineering 676 and 310, or consent of instructor.
D. Hammerstrom.
Design and evaluation of processor and memory architectures is examined in light of actual implementations of both large-scale and small-scale (microprocessors) systems. Topics include: microprogramming and directly executable languages, number representation and instruction set trade-offs, parallel and pipelined architectures, interleaved memories, cache and virtual memories, multilevel memory hierarchies, and protection mechanisms.

678 Computer Input/Output and Distributed Architectures Spring. 4 credits. Prerequisite: Electrical Engineering 677 or permission of instructor.
H. C. Torng.
Methods and approaches to input/output processing, device interface, selector and multiplexor channels, parallel processing, task partitions and resource allocations, distributed processing, interconnection topology, minicomputer and microcomputer networks, interprocessor communications.

679 Current Topics in Computer Engineering Fall. 3 credits. 2 lec. Prerequisite: Electrical Engineering 677 or coregistration in 677.
D. Hammerstrom, H. C. Torng.
In-depth treatment of current and emerging computer engineering research and development activities. Topics vary from year to year and are chosen from research reports and published journal articles. Subjects may include: fault tolerant computing, reliability studies, innovative microcomputer structures, direct execution of high-level languages, and impact of very-large-scale integration technologies on computer organizations.

[680 Elementary Plasma Physics and Gas Discharges Fall. 3 credits. 2 lec, 1 lab. Prerequisite: Electrical Engineering 304 or equivalent. Not offered 1979–80.
Coordinated lectures and ten experiments. Discharges, arcs, reflex discharge. Positive column, collisions, diffusion, breakdown, sheaths. Langmuir probes. Electromagnetic waves, plasma oscillations, space-charge waves, cyclotron harmonic radiation. Microwave and laser interferometers. Relativistic electron beams.]

681 Introduction to Plasma Physics (also A&EP 606) Fall. 4 credits. 3 lec. Prerequisites: Electrical Engineering 303 and 304 or equivalent. First-year graduate-level course; open also to *exceptional* fourth-year students at discretion of instructor.
R. N. Sudan.
Plasma state; motion of charged particles in fields; collisions, coulomb scattering; transport coefficients, ambipolar diffusion, plasma oscillations and waves; hydromagnetic equations; hydromagnetic stability and microscopic instabilities; test particle in a plasma; elementary applications.

682 Advanced Plasma Physics (also A&EP 607) Spring. 4 credits. 3 lec. Prerequisite: Electrical Engineering 681.
R. N. Sudan.
Boltzmann and Vlasov equations; waves in hot plasmas; Landau damping, microinstabilities; drift waves, low-frequency stability, collisional effects; method of dressed test particles, high-frequency conductivity and fluctuations; neoclassical toroidal diffusion, high powered beams.

683 Electrodynamics Fall. 4 credits. 3 lec. Prerequisite: Electrical Engineering 304 or equivalent.
Maxwell's equations, electromagnetic potentials, integral representations of the electromagnetic field. Special theory of relativity. Radiation of accelerated charges, Cerenkov radiation. Optional topics: electrodynamics of dispersive dielectric and magnetic media; elementary quantum electrodynamics, second quantization, interaction of electromagnetic fields with atoms. At the level of *Classical Electrodynamics* by Jackson.

684 Microwave Theory Spring. 4 credits. 3 lec. Prerequisite: Electrical Engineering 304 or equivalent.
P. McIsaac.
Theory of passive microwave devices. Homogeneous and inhomogeneous waveguides. Nonreciprocal waveguide devices. Scattering matrix analysis of multiport junctions, resonant cavities, directional couplers, isolators, circulators. Periodic waveguides, coupled mode theory. At the level of *Introduction to the Theory of Microwave Circuits* by Kurokawa.

685–686 Upper Atmosphere Physics I and II 685, fall; 686, spring. 3 credits each term. 3 lec.
Physical processes in the earth's ionosphere and magnetosphere, the solar corona, and the solar wind. Diagnostic techniques including radar and in situ observations; production, loss, and transport of charged particles in the ionosphere and magnetosphere; airglow; tides, winds, and gravity waves; electric fields generated by the solar wind and winds in the neutral atmosphere and their effects on transport processes; the equatorial and auroral electrojets; instabilities in space plasmas; structure of the solar corona and solar wind and their interaction with the magnetosphere; acceleration and drift of energetic particles in the magnetosphere; precipitation of particles and the aurora; magnetic and ionospheric storms.

[687 Electromagnetic Wave Propagation I Fall. 3 credits. 3 lec. Not offered 1979–80.
Some aspects of antenna theory; diffraction; refraction and ducting in the troposphere; propagation of radiowaves and cold plasma waves in the ionosphere and magnetosphere; Alfven, whistler mode, and hybrid waves; the CMA diagram; WKB solutions of the coupled wave equations.]

[688 Electromagnetic Wave Propagation II Spring. 3 credits. 3 lec. Not offered 1979–80.
Full-wave solutions of the wave equations;

interactions between particles and waves; scattering of radio waves from random fluctuations in refractive index; scatter propagation; incoherent scatter from the ionosphere and its use as a diagnostic tool; radio star and satellite scintillations and their use as diagnostic tools; radar astronomy.]

690 Fundamentals of Acoustics (also T&AM 666) Spring. 3 credits. 3 lec. biweekly lab.
See T&AM 666 for course description.

691–699 Special Topics in Electrical Engineering 1–3 credits.
Seminar, reading course, or other special arrangement agreed upon between the students and faculty members concerned.

721 Theory of Linear Systems Fall. 4 credits.
Prerequisite: Electrical Engineering 302 or permission of instructor.
The state-space model for linear systems. Fundamental and transition matrices. Matrix exponential functions, the Cayley-Hamilton theorem, and the Jordan form. Forced network and system response. Controllability, observability, stability, realizability. Applications of Fourier, Laplace, Hilbert transforms. Paley-Wiener theorem. At the level of *System Theory* by Padulo and Arbib.

722 Theory of Nonlinear Systems Spring. 4 credits. 3 lec. Prerequisite: Electrical Engineering 721.
Analysis of nonlinear systems with applications. Phase-plane analysis; singular points, limit cycles, and equilibrium states. Stability of nonlinear systems; the methods of Lyapunov and Popov; circle criteria. Forced nonlinear systems; periodic systems, Floquet theory, Mathieu-Hill theory; applications to the stability of nonlinear and parametrically excited systems.

731 Quantum Electronics I Fall. 4 credits. 3 lec. 1 rec-computing session. Prerequisites: Electrical Engineering 306 and 407 or Physics 443.
A detailed treatment of the physical principles underlying lasers and masers, related fields, and applications. Topics include: a review of quantum mechanics and the quantum theory of angular momentum; the interaction of radiation and matter, the quantum mechanical density matrix and macroscopic material properties, theory of the laser and maser.

732 Quantum Electronics II Spring. 4 credits. 3 lec. 1 rec-computing session. Prerequisite: Electrical Engineering 731 or permission of instructor.
A continuation of 731. Topics include: optical resonators, output power of amplifiers and oscillators; dispersive effects and laser oscillation spectrum. Spectroscopy of atoms, molecules, and ions in crystals as examples of laser media; survey of chemical and dye lasers; noise in optical devices; principles of electro-optic and parametric devices.

733 Opto-Electronic Devices Fall. 4 credits. 3 lec. 1 rec. Prerequisites: Electrical Engineering 304 and 630 or equivalent.
An understanding of physical properties of solids that affect use in optical devices is sought. Wave propagation in lossy, anisotropic, layered, and electro-optic media; microscopic and band-theoretic models for dielectric constant and loss; carrier transport, scattering and trapping; photoconductivity; electro-optics, photoemissive and photoconductive devices; noise in optical detectors.

734 Theory and Applications of Nonlinear Optics 4 credits. 3 lec. 1 rec. Prerequisite: Electrical Engineering 731 or 733 or equivalent of Physics 572.
Recent developments in the theory and applications of nonlinear optics and related electro-optic devices. Topics include: properties and theories on nonlinear optical processes; nonlinear and electro-optic properties of III-IV and II-VI compounds and other optical materials; optical mixing; spontaneous and stimulated processes involving nonlinear interactions of electromagnetic waves, phonons, and molecular vibrations.

735 Solid State Devices I Fall. 4 credits. 3 lec. Prerequisite: Electrical Engineering 630 or equivalent.
C. A. Lee.
Band structure, generation recombination statistics, ambipolar transport, deep level spectroscopy, p-n junction analysis, contact technology, secondary ionization, and noise. A review of ion implantation technology with emphasis on associated material and device problems. Topics are presented on the level of current device research literature. Presentation concentrates on relating basic material properties to device parameters. Term paper.

736 Solid State Devices II Spring. 4 credits. 3 lec. Prerequisite: Electrical Engineering 735 or equivalent.
C. A. Lee.
A general treatment of the time dependence of secondary ionization and the simpler "quasistatic" approximation. Applications to microwave generation and amplification and broadband optical detection, including stability, nonlinearity, and noise. The fundamentals of transferred electron devices, including band structure, distribution functions, stability, and doping configurations of devices. Term paper.

737 Physics and Technology of Very-Large-Scale Integration (VLSI) Fall. 3 credits. No lab. Prerequisites: Electrical Engineering 631–632.
J. Frey.
Basic materials and technology problems to be considered in the design and fabrication of VLSI circuits. The material problems include: reduction of threshold voltage in submicron-channel MOSFET's; hot-electron tunneling through MOSFET oxides; mobility reductions in thin epitaxial layers; role of velocity overshoot effects in short-channel devices; comparison of elemental and compound semiconductors. Technology problems include: fabrication methods for submicron dimensions; light-sensitive, electron-beam, and x-ray resists; testing of VLSI circuits; throughput; yield.

738 Physics of Solid-State Devices Spring. 2–3 credits. 2 lec. Prerequisite: Electrical Engineering 736 or equivalent.
Basic theory of electron and hole scattering in semiconductors. Examination of methods for obtaining high electric field solutions for the distribution function from the Boltzmann equation. Hot electron phenomena reviewed with emphasis on band-structure induced instabilities.

761–762 Random Processes in Electrical Systems 761, fall; 762, spring. 4 credits each term. 3 lec. Prerequisites: Electrical Engineering 302 and 310.
The concepts of randomness and uncertainty and their relevance to the design and analysis of electrical systems. An axiomatic characterization of random events. Probability measures, random variables, and random vectors. Distribution functions and densities. Functions of random vectors. Expectation and measures of fluctuation. Moments and probability inequalities. Properties and applications of characteristic functions. Modes of convergence of sequences of random variables; laws of large numbers and central limit theorems. Kolmogorov consistency conditions for random processes. Poisson process and generalizations. Gaussian processes. Covariance stationary process, correlation function, spectra; Bochner and Wiener-Khinchin theorems. Continuity, integration, and differentiation of sample functions. Optimum filtering and prediction. Spectral representation, orthogonal series representations. Markov chains and processes. Linear and nonlinear transformations of random processes.

[763 Advanced Topics in Information Theory Fall. 4 credits. 3 lec. Prerequisites: Electrical Engineering 662 and either 761 or Mathematics 571 or permission of instructor. Not offered 1979–80.
An in-depth treatment of an information theory research area. The topic varies from year to year and is chosen from the following subjects: source encoding (rate-distortion theory), convolutional codes and sequential decoding, multiterminal communication networks, ergodic theory and information, and complexity and instrumentability of coding schemes.]

764 Foundations of Inference and Decision Making Spring. 3 credits. 3 lec. Prerequisite: a course in probability and some statistics, or permission of instructor.
An examination of methods for characterizing uncertainty and chance phenomena and for transforming information into decisions and optimal systems. Discussion of the foundations of inference includes: comparative probability; quantitative probability; relative frequency interpretations; computational complexity; randomness; classical probability and invariance; induction; subjective probability.

771 Estimation and Control in Discrete Linear Systems Fall. 4 credits. 3 lec. Prerequisites: Electrical Engineering 302 and 310 or permission of instructor.
Optimal control, filtering, and prediction for discrete time linear systems with extensive use of the APL/360 system. Approximation on discrete point sets. The principle of optimality. Kalman filtering. Stochastic optimal control.

772 Optimal Control and Estimation for Continuous Systems Spring. 4 credits. 3 lec. Prerequisite: Electrical Engineering 771 or permission of instructor.
Control system design through parameter optimization, with and without constraints. The minimum principle; linear regulators, minimum time and minimal fuel problems. Computational techniques; properties of Lyapunov and Riccati equations.

[773 Random Processes in Control Systems Spring. 4 credits. 3 lec. Prerequisites: Electrical Engineering 762 and 772. Not offered 1979–80.
Prediction and filtering in control systems: Gaussian-Markov process, prediction problem, stochastic optimal and adaptive control problems. Control of systems with uncertain statistical parameters; stochastic differential equations, optimal nonlinear filtering; stability of control systems with random parameters.]

781 Kinetic Theory (also A&EP 761) Fall. 3 credits. 2 lec. Prerequisite: Electrical Engineering 407 or Physics 561, or permission of instructor. Offered alternate years.
R. L. Liboff.
Theory of the Liouville equation. Prigogine and Bogoliubov analysis of the BBKGY sequence. Master equation, density matrix. Wigner distribution. Derivation of fluid dynamics. Transport coefficients. Boltzmann, Krook, Fokker-Planck, Landau, and Balescu-Lenard equations. Properties and theory of the linear Boltzmann collision operator. The relativistic Maxwellian. Klimontovich formulation. At the level of *Introduction to the Theory of Kinetic Equations* by Liboff.

782 Nonlinear Phenomena in Plasma Physics Fall. 3 credits. Corequisite: Electrical Engineering 682.
(1) Coherent nonlinear processes (echoes, trapped particles, solitary waves, shocks, and parametric instabilities); (2) statistical theories of plasma turbulence (quasilinear theory, wave kinetic equations, the random phase approximation, resonant mode-mode coupling, nonlinear Landau

damping, strong turbulence, and anomalous transport). Applications to controlled fusion and space plasmas.

791–792 Electrical Engineering Colloquium 791, fall; 792, spring. 1 credit each term. For students enrolled in the graduate Field of Electrical Engineering.
Lectures by staff, graduate students, and visiting authorities. A weekly meeting for the presentation and discussion of important current topics in the field.

793–794 Electrical Engineering Design 793, fall; 794, spring. 3 credits each term. For students enrolled in the M.Eng.(Electrical) degree program. Utilizes real engineering situations to present fundamentals of engineering design.

795–799 Special Topics in Electrical Engineering 1–3 credits.
Seminar, reading course, or other special arrangement agreed upon between the students and faculty members concerned.

Geological Sciences

Freshman and Sophomore Courses

101 Introductory Geological Sciences Fall or spring. 3 credits. 2 lec, 1 lab; evening exams; field trips.
C. J. Ando, fall; J. M. Bird, spring.
Understanding the natural earth; weathering, erosion, the evolution of coast lines and river valleys, glaciation, the origins of earthquakes and mountains, the genesis of volcanoes, and the drifting of continents. Studies of ground water, mineral deposits, petroleum, and coal. Recognizing major minerals and rocks, interpretation of topographic and geologic maps.

102 Introduction to Historical Geology Spring. 3 credits. 2 lec, 1 lab; evening exams. Prerequisite: Geological Sciences 101 or permission of instructor.
J. L. Cisne.
A continuation of 101. History of the earth and life in terms of evolutionary processes. The geologic record, its formation, and interpretation of earth history. Introduction to the evolution of life and to fossils and their use in reconstructing past environments and dating rocks.

103 Earth Science Fall. 3 credits (see Geol 105, Earth Science Laboratory). 3 lec.
A. L. Bloom.
Physical geography, including earth and lunar orbits that determine seasons and tides. Figure and structure of the earth; climatic regions; atmospheric and oceanic circulation; erosion by rivers, glaciers, wind, and waves; climatic change.

105 Earth Science Laboratory Fall. 1 credit. To be taken concurrently with Geol 103, Earth Science.
A. L. Bloom.
Astronomical determination of position and seasonal events. Topographic mapping and map interpretation. Minerals and rocks, world climatic regions.

107 Frontiers of Geology I Fall. 1 credit. 1 lec. May be taken concurrently with or after Geological Sciences 101.
J. L. Cisne and staff.
Lectures by members of the department on selected fundamental topics of current interest, such as continental drift and related tectonic processes, volcanoes, earthquake prediction, natural energy sources, and mineral resources.

108 Frontiers of Geology II Spring. 1 credit. 1 lec. May be taken concurrently with or after Geological Sciences 101 or 102.
J. L. Cisne and staff.
Lectures by members of the department on selected fundamental topics of current interest such as plate tectonics, the evolution of mountain belts and island arcs, the deep structure of continents, ecology and evolution of fossil organisms, correlation of strata by fossils, sea-level changes, and fossil fuels.

[131 Geology and the Environment Fall. 3 credits. 2 lec, 1 lab. Field trips. Not offered 1979–80.
The principles of geological science, with emphasis on the physical phenomena and rock properties as they influence the natural environments of man.]

262 Mineral and Energy Resources and the Environment Spring. 3 credits. 2 lec, 3 exercises; reading assignments, term projects.
Staff.
Occurrence, location, and scientific principles underlying the availability of mineral and energy resources of today and tomorrow. Limitations on utilization imposed by economic and environmental factors, hazards, patterns of usage, and industrial development. Relation to national and international policy and conservation.

Junior, Senior, and Graduate Courses

Of the following, the core courses Geological Sciences 325, 345, 355–356, 376, and 388 may be taken by those who have successfully completed Geological Sciences 101–102 or the equivalent, or who can demonstrate to the instructor that they have adequate preparation in mathematics, physics, chemistry, biology, or engineering.

325 Structural Geology and Sedimentation Spring. 4 credits. 3 lec, 1 lab. Prerequisite: Geological Sciences 101 or permission of instructor.
D. E. Karig.
Nature, origin, and recognition of geologic structures. Behavior of geologic materials. Geomechanical and tectonic principles applied to the solution of geologic problems. Introduction to the sedimentary processes and petrology of sedimentary rocks. Description, classification, provenance, transportation, depositional environment of sediments, and diagenesis of sediments.

345 Geomorphology Fall. 4 credits. 2 lec, 1 lab. Prerequisite: Geological Sciences 102 or permission of instructor.
A. L. Bloom.
Description and interpretation of land forms in terms of structure, process, and stage.

355 Mineralogy, Petrology, and Geochemistry I Fall. 4 credits. 2 lec, 1 lab; assigned problems and readings; field trips. Prerequisite: Geological Sciences 102 or permission of instructor.
W. A. Bassett.
Megascopic and optical properties, chemistry, structure, and petrogenetic significance of rock-forming minerals. Principles of phase equilibria as applied to igneous and metamorphic systems. Description, classification, chemistry, origin, regional distribution, and dating of igneous and metamorphic rocks. Geochemical distribution of trace elements and isotopes in igneous and metamorphic systems.

356 Mineralogy, Petrology, and Geochemistry II Spring. 4 credits. 2 lec, 1 lab; assigned problems and readings; field trips.
R. W. Kay.
Principles of phase equilibrium as applied to igneous and metamorphic systems. Description, classification, chemistry, origin, regional distribution, and dating of igneous and metamorphic rocks. Geochemical distribution of trace elements and isotopes in igneous and metamorphic systems. The petrological evolution of the planets.

376 Historical Geology and Stratigraphy Fall. 4 credits. 2 lec, 2 labs; assigned problems.
J. L. Cisne.
Application of geologic principles to interpretation of earth history; development of the geologic column, geochronology, and geochronometry; correlation by fossils and the zone concept; sedimentary environments and provinces; geosynclines and platforms; problems of the pre-Cambrian and continental evolution.

388 Geophysics and Geotectonics Spring. 4 credits. 3 lec, 1 lab. Prerequisites: Mathematics 112 and Physics 208 or equivalent.
B. L. Isacks.
Global tectonics and the deep structure of the solid earth as revealed by investigations of earthquakes, earthquake waves, the earth's gravitational and magnetic fields, and heat flow.

410 Experiments and Techniques in Earth Sciences Spring. 2 credits. Prerequisites: Physics 207–208 and Mathematics 191–192 or equivalents, or permission of instructor.
S. Kaufman.
Lab and field experiments chosen in accordance with students' interests. Familiarization with instruments and techniques used in earth sciences. Independent work is stressed.

423 Petroleum Geology Spring. 3 credits. 3 lec, 1 lab; field trip. Recommended prerequisite: Geological Sciences 325.
S. B. Bachman.
Sedimentation and tectonics as conditions of hydrocarbon entrapment. Problems of petroleum exploration, including economics of exploration, subsurface mapping, the movement of underground fluids, and the geophysical properties of subsurface fluids and sediments. Organization and operation of the petroleum industry; on-shore and off-shore exploration and production techniques.

424 Tectonics of Orogenic Zones; Modern and Ancient Spring. 3 credits. 1 lec. Prerequisite: permission of instructors. Offered alternate years.
W. B. Travers, D. E. Karig.
A comparative study of island arcs and mountain ranges.

[428 Geomechanics Spring. 3 credits. 3 lec. Prerequisites: Mathematics 240 or 296; Geological Sciences 101. Not offered 1979–80.
D. L. Turcotte.
Use of mathematical analysis to explain such geological observations as ocean ridges — their thermal structure, elevation, heat flow, and gravity; ocean trenches — the structure and mechanics of the bending lithosphere; folding — buckling, viscous, and plastic flow; faulting — a detailed mechanical and geological study of the San Andreas fault; intrusives — geothermal power.]

431 The Earth's Crust: Structure, Composition, and Evolution Fall. 3 credits. 3 lec. Prerequisites: Geological Sciences 356 and 388.
L. D. Brown.
Structure and composition of the crust from geophysical observations, analysis of xenoliths, and extrapolation of petrological laboratory data. Radioisotopic considerations. The nature of the crust-mantle boundary. Thermal and rheological structure of the crust. Oceanic vs. continental crust. Origin and evolution of oceanic and continental crust.

[432 Digital Processing and Analysis of Geophysical Data Spring. 3 credits. 3 lec. Prerequisites: Geological Sciences 488 and familiarity with a programming language. Not offered 1979–80.
L. D. Brown, S. Kaufman.
Sampling theory. Fourier, Laplace, and Z-transform techniques. Spectral and cepstral analysis. Temporal and spatial filtering. Geophysical modeling. Deconvolution, migration, and velocity analysis of reflection data. Downward and upward continuation of potential field data.]

433 Interpretation of Seismic Reflection Data Spring. 3 credits. 2 lec, 1 lab. Prerequisite: Geological Sciences 488 or equivalent.
L. D. Brown, S. Kaufman.
Techniques for inferring geologic structure and lithology from multichannel seismic reflection data. Data processing sequences: migration, velocity analysis, correlation criteria, resolution considerations, wave form analysis, and synthetic seismograms. Synergistic approaches to interpretation. Seismic stratigraphy.

455 Isotope Geology Fall. 3 credits. 3 lec. Prerequisite: Geological Sciences 355–356 or equivalent.
R. W. Kay.
Nucleosynthetic processes and the isotopic abundance of the elements. Dating by Pb, Ar, Sr, and Nd isotope variations. Theories of crustal and mantle evolution. Pleistocene chronology using U-series and ^{14}C dating. Time constants for geochemical cycles. The use of O and H isotopes as tracers in the earth's hydrosphere, and hydrothermal circulation systems.

456 Chemical Geology Spring. 3 credits. 3 lec. Prerequisite: Geological Sciences 355–356 or equivalent.
W. A. Bassett, R. W. Kay.
Crystallography and crystal chemistry of minerals and the methods for their study. Thermodynamic evaluation of homogeneous and heterogeneous equilibrium and disequilibrium processes of geologic interest. Topics include crystal symmetry, mineral structures, x-ray diffraction, mineral equilibrium, and diffusion in minerals.

461 Mineral Deposits I Fall. 4 credits. 3 lec, 1 lab; assigned problems and readings; field trip. Prerequisite: Geological Sciences 365 or permission of instructor.
A. K. Gibbs.

462 Mineral Deposits II Spring. 4 credits. 3 lec, 1 lab; field trips. Prerequisites: Geological Sciences 461 or permission of instructor.
A. K. Gibbs.

471 Invertebrate Paleontology Fall. 4 credits. 2 lec, 2 labs. Prerequisites: Geological Sciences 102 and a course in invertebrate zoology.
J. L. Cisne.
Paleobiology and classification of important fossil invertebrates. Problems of evolution. Use of organisms in reconstructing past environments.

473 Stratigraphy Fall. 3 credits. 2 lec, 1 additional hour to be arranged. Prerequisite: Geological Sciences 376.
S. B. Bachman.
Principles of stratigraphy, developed by detailed study of selected American and European systemic examples.

483 Marine Tectonics Fall. 3 credits. 2 lec; possible field trips. Prerequisites: Geological Sciences 325 and a course in physics or geophysics.
D. E. Karig.
Study of geophysical and geological characteristics of the earth's crust beneath the oceans. Review of strengths and limitations of marine exploratory techniques. Emphasis on recent geologic data concerning plate margins in the ocean, especially the island arc systems.

[485 Physics of the Earth I Fall. 3 credits. 2 lec, 1 lab. Limited to upperclass engineers, majors in the physical sciences, and others by permission of instructor. Not offered 1979–80.
D. L. Turcotte.
Rotation and figure of the earth, gravitational field, seismology, geomagnetism, creep and anelasticity, radioactivity, earth's internal heat; continental drift, and mantle convection.]

488 Introduction to Geophysical Prospecting Fall. 3 credits. 2 lec. Prerequisites: Physics 112–213 and Mathematics 191–192, or equivalents, or permission of instructor.
S. Kaufman.
Physical principles, instrumentation, operational procedures, and interpretation techniques in geophysical exploration for oil, gas, and minerals. Seismic reflection, seismic refraction, gravity, and magnetic and electrical methods of exploration.

490 Senior Thesis Fall or spring. 1 credit.
Staff.

642 Glacial and Quaternary Geology Spring. 3 credits. 2 lec, 1 lab; several Saturday field trips. Prerequisite: Geological Sciences 345 or permission of instructor.
A. L. Bloom.
Glacial processes and deposits and the stratigraphy of the Quaternary.

[681 Geotectonics Fall. 4 credits. 2 lec. Prerequisite: permission of instructor. Not offered 1979–80.
J. M. Bird.
Theories of orogeny; ocean and continent evolution. Kinematics of lithosphere plates. Rock-time assemblages of modern oceans and continental margins, and analogs in ancient orogenic belts. Time-space reconstructions of specific regions. Problems of dynamic mechanisms — corollaries and evidence from crustal features.]

[685 Advanced Geophysics I Fall. 3 credits. 3 lec. Prerequisite: Geological Sciences 388 or 485. Not offered 1979–80.
D. L. Turcotte.
Mantle convection, heat flow, the driving mechanism for plate tectonics, the energy balance, definition of the lithosphere.]

686 Advanced Geophysics II Spring. 3 credits. 3 lec. Prerequisite: Geological Sciences 388 or 485. Not offered 1979–80.
D. L. Turcotte.
Gravity, figure of the earth, earth tides, magnetism, mechanical behavior of the lithosphere, changes in sea level.]

687 Seismology I Fall. 3 credits, 3 lec-rec. Prerequisite: T&AM 611 or equivalent. Offered alternate years.
B. L. Isacks.
Generation and propagation of elastic waves in the earth. Derivation of the structure of the earth and the mechanism of earthquakes from seismological observations.

[688 Seismology II Spring. 3 credits. Prerequisite: Geological Sciences 687. Not offered 1979–80
B. L. Isacks.
A continuation of Geological Sciences 687.]

690–699 Seminars and Special Work Fall and spring. 2 or 3 credits each term. Prerequisite: permission of instructor.
Advanced work on original investigations in geological sciences.

690 Structural geology, sedimentation, and tectonics. W. B. Travers.

691 Petrology and geochemistry. R. W. Kay.

692 Coastal geomorphology and Quaternary geology. A. L. Bloom.

693 Environmental-engineering geology, geomechanics, and hydrogeology.

694 Geophysics, seismology, gravity, magnetism, heat flow, geotectonics. B. L. Isacks, D. E. Karig, S. Kaufman, J. E. Oliver, D. L. Turcotte.

695 Invertebrate paleontology and paleoecology. J. L. Cisne.

696 Mineral deposits and resources. Staff.

697 Environmental problems. W. B. Travers.

698 Marine geology. D. E. Karig.

699 Plate tectonics and geology. J. M. Bird.

Field Courses

[601 Intersession Field Trip January intersession. 1 credit. Prerequisites: Geological Sciences 101–102 or equivalent and permission of instructor. Travel and subsistence expenses to be announced. Not offered 1979–80.
A trip of one week to ten days in an area of interesting geology in the lower latitudes. Interested students should contact the instructor during the early part of the fall semester.]

604 Western Adirondack Field Course Spring. 1 credit. One week at the end of the spring semester.
W. A. Bassett.
Field mapping methods, mineral and rock identification, examination of Precambrian metamorphic rocks and lower Paleozoic sediments, talc and zinc mines. Students should be prepared for overnight camping and will have to pay for their own meals.

[704 Western Field Course Spring. 6 credits. Weekly rec and 35-day trip to California, Nevada, and Utah. Prerequisites: four courses in Geological Sciences at the 300 level, and permission of instructor. Students should be prepared for overnight camping and will have to pay for their own meals. Not offered 1979–80.
W. B. Travers.
A comparative study of California Coast Range, Sierra Nevada, Basin and Range of Nevada, and Uinta Mountains, Utah. Pretrip seminars and extensive reading at Cornell. Study of Mesozoic ophiolites, and subduction near San Luis Obispo, California; recent earth movements along the San Andreas fault near San Francisco; granitic pluton emplacement and volcanism in the northern Sierra Nevada; multiplephase mountain building near Dixie Valley, Nevada; sedimentology and block faulting of the Uinta Mountains, Utah. Five-day raft trip on the Green River through the core of the Uinta mountains. Visit to an oil field in California and a mine in Nevada. Lectures and field trips with local experts.]

Materials Science and Engineering

Undergraduate Courses

201 Elements of Materials Science Spring. 3 credits.
Relations between atomic structure and macroscopic properties of such diverse materials as metals, ceramics, and polymers. Properties discussed include magnetism, superconductivity, insulation, semiconductivity, mechanical strength, and plasticity. Applications to microelectronics, desalinization by reverse osmosis, superconducting power transmission lines, synthetic bones and joints, etc. Extensive use of slides, audiotutorial systems, movies.

261 Introduction to Mechanical Properties of Materials Fall. 3 credits. 2 lec, 1 rec or lab.
See description under Division of Basic Studies.

262 Introduction to Electrical Properties of Materials Spring. 3 credits. 2 lec, 1 rec or lab.
See description under Division of Basic Studies.

331 Structure and Properties of Materials Fall. 4 credits. 3 lec, 1 lab.
The most widely used techniques to investigate materials such as metals, glasses, ceramics, and polymers; associated laboratory work teaches the use of the optical microscope and x-ray diffraction, and exposes the student to electron microscopy and the use and application of the scanning electron microscope. Discussion of how knowledge of microscopic structure obtained with these techniques can be used to predict and understand important engineering properties.

333 Research Involvement I Fall. 3 credits.
Prerequisite: approval of department.
Semi-independent research project in affiliation with faculty member and research group of the department.

334 Research Involvement II Spring. 3 credits.
Prerequisite: approval of department.
May be a continuation of MS&E 333 or a one-term affiliation with a research group.

335 Thermodynamics of Condensed Systems
Fall. 3 credits. 3 lec.
The various phases of materials and the changes that occur when temperatures and pressures change are considered by developing the laws of thermodynamics and applying them to different systems. The use of phase diagrams to predict the phase(s) of an alloy system at any given temperature and pressure in order to understand heat treatment such as the hardening of aluminum alloys and the quenching of steels. Phase transformations under conditions of quenching and their influence on hardness. Guidelines for heat treatment of steels.

336 Kinetics, Diffusion, and Phase Transformations Spring. 3 credits. 3 lec.
Introduction to absolute rate theory, atomic motion, and diffusion. Applications to nucleation and growth of new phases in vapors, liquids, and solids; solidification, crystal growth, oxidation and corrosion, radiation damage, recrystallization, gas-metal reactions.

337 Materials and Manufacturing Processes (also M&AE 311) Fall or spring. 3 credits. 2 lec, 1 lab.
May be taken in addition to MS&E 261. Prerequisite: T&AM 202 or permission of instructor.
See M&AE 311 for course description.

338 Analysis of Manufacturing Processes (also M&AE 512) Spring. 3 credits. 3 rec. Prerequisite: MS&E 337.
See M&AE 512 for course description.

346 Mechanical Properties of Materials Fall. 3 credits. 3 lec.
The mechanical properties of materials and how they can be understood and analyzed in terms of microscopic irregularities (lattice defects) in perfect regular crystals. The general relation between stress and strain; the concept of equivalent stresses and strains. How the concept of local defects can explain many aspects of plastic flow, creep, fatigue, and rupture in classical and new engineering materials. Application of these concepts to the development of improved materials.

440 Macroprocessing of Materials Spring. 3 credits. 3 lec, occasional lab.
Control of chemical composition through smelting, reaction, and refining processes; applications to iron and steel, aluminum, refractories, etc. Shape control; casting and solidification, welding; mechanical shaping through rolling, drawing, etc. Deformation and annealing, textures; relation to material properties. Thermomechanical treatments for control of material properties.

441 Microprocessing of Materials Fall. 3 credits. 3 lec, occasional lab.
The materials technology of electronic and magnetic devices; single crystals as well as thin films. Growth and purification (zone refining) of semiconducting crystals; doping procedures, including ion implantation; composition control; oxide growth; photoetching. Preparation of thin films by vapor deposition; sputtering; plating; evaluation of film geometry and composition. Material aspects of recent devices (superlattice growth, magnetic amorphous bubbles, etc.)

443–444 Senior Materials Laboratory 443, fall; 444, spring. 3 credits.
Experiments are available in structural studies, properties of materials, deformation and plasticity, mechanical and chemical processing, phase transformation, surface physics, etc.

445 Electrical and Magnetic Properties of Materials Spring. 3 credits. 3 lec.
An introduction to electrical and magnetic properties of materials with emphasis on structural aspects. Classification of solids, charge and heat transport in metals and alloys, semiconductors and insulators, principles of operation and fabrication of semiconductor devices, behavior of dielectric and magnetic materials, magnetic devices, phenomenological description of superconducting materials.

447 Materials Engineering (also M&AE 513) Spring. 3 credits. 2 lec, 1 lab. Prerequisite: MS&E 261 or M&AE 311 or permission of instructor.
W. W. Carson.
See M&AE 513 for course description.

448 Current Topics in Materials Spring. 3 credits. 3 lec.
Coordinated lectures on topics of current interest, such as biomaterials, fuel cells, composite materials, materials problems in power generation and distribution systems, stress corrosion cracking.

449 Introduction to Ceramics Fall. 3 credits. 3 lec. Prerequisite: MS&E 261 or permission of instructor.
Designed to develop an understanding of ceramic materials and processes for engineering applications. The crystallographic nature of some ceramics, and structural imperfections that can occur. Ionic motions in crystalline ceramics and their relation to properties and forming methods (such as sintering). Mechanical properties, such as cracking, in terms of microscopic mechanisms. The properties of some new ceramic materials, such as silicon nitride and barium titanate, in special applications.

460 Introduction to Polymers Spring. 3 credits. 3 lec.
Inorganic, organic, and biological polymers. Physical properties of long-chain molecules. Molecular weight distribution and measurement. Gelation and the properties of networks. Rubber elasticity. Amorphous and crystalline polymers for engineering use: their structure and mechanical and thermal properties. Elements of composite material properties.

Graduate-Level Professional Courses

553–554 Special Project 553, fall; 554, spring. 6 credits each term.
Research on a specific problem in the materials area.

Graduate Core Courses

601 Topics in Thermodynamics and Kinetics Fall. 3 credits.
The following topics are treated for condensed systems: free energy and phase equilibria; thermodynamics of solutions; interfaces; thermodynamics under applied fields; irreversible thermodynamics; reaction rate theory and diffusion.

602 Elasticity and Physical Properties of Crystals Fall. 3 credits.
Cartesian tensors, elastic stress and strain, constitutive relations between stress and strain, symmetry of crystals, generalized tensor representation of elasticity and other reversible and irreversible properties of crystals, mathematical theory of infinitesimal elasticity with applications including wave propagation and stress fields of dislocations, mathematical theory of yield stress and plasticity, origin of elastic behavior, including rubberlike behavior. At the level of *Physical Properties of Crystals* by Nye.

603 Structure of Solids Spring. 3 credits.
Prerequisites: MS&E 601 and 602, or equivalent.
Binding energies in perfect crystals. Structure and energetics of point; line and planar defects in crystalline materials, including metals, ionic solids, covalent solids, and polymers. Interactions between defects. Bonding and random packing in amorphous materials. Observation of defects in crystalline materials. Structural analysis of amorphous materials.

604 Plastic Flow and Fracture of Materials Fall. 3 credits.
Experimental and theoretical aspects of the deformation and failure of structural materials. Although the emphasis is on metals and alloys, consideration is given also to glasses, ceramics, and polymeric materials. Some of the topics included are: theory and practice of mechanical testing, deformation behavior of polycrystal and single-crystal metals, phenomenological theories of deformation, micromechanical theories of plastic flow and creep, relationship of microstructure to mechanical properties, brittle and ductile fracture of materials.

605 Phase Transformations Spring. 3 credits.
Prerequisites: MS&E 601, 602, and 603, or equivalent.
Nucleation theory. Growth theory. Formal theory of nucleation and growth transformation. Spinodal decomposition. Diffusionless transformations. Discussions of topics such as crystal growth from the vapor, solidification, eutectic transformations, solid state precipitation, eutectoid transformations, martensitic transformations. Transformations in polymers and glasses. At the level of *Phase Transformations*, American Society of Metals, 1970.

Related Course in Another Department

Introductory Solid-State Physics (Physics 454)

Further Graduate Courses

610 Principles of Diffraction (also A&EP 711)
Fall. 3 credits. Offered alternate years.
Introduction to diffraction phenomena as applied to solid-state problems. Scattering and adsorption of neutrons, electrons, and x-ray beams. Diffraction from two- and three-dimensional periodic lattices. Fourier representation of scattering centers, and the effect of thermal vibrations. Phonon information from diffuse x-ray and neutron scattering and Bragg reflections. Diffraction from almost-periodic structures, surface layers, gases, and amorphous materials. Survey of dynamical diffraction from perfect and imperfect lattices.

611 Friction and Wear of Materials (also M&AE 581) Spring. 3 credits. 3 lec.
See M&AE 581 for course description.

614 Electron Microscopy 3 credits.
Electron optics. Abbé theory of image formation with applications to the direct imaging of small defects and atomic planes. Kinematical theory of diffraction with applications to the study of the structure of grain boundaries and the imaging of crystal defects. Dynamical theory of diffraction as applied to the calculation of the images of crystal defects. Instruction in the use of the microscope.

669 Ceramic Materials 3 credits. Prerequisites: MS&E 601 and some familiarity with crystal structures.
Crystal structure and bonding of typical ceramic materials; structure of silicate and nonsilicate glasses; imperfections in oxides; point defects and point defect chemistry, line defects, extended defects; diffusion in stoichiometric and nonstoichiometric ceramics; phase transformations; equilibrium and nonequilibrium phases; grain growth and sintering; plastic deformation and creep; topics from research papers.

701 Electrical and Magnetic Properties of Materials 3 credits. Prerequisite: Physics 454 or equivalent.
Electronic transport properties of metals and semiconductors, semiconductor devices, optical and dielectric properties of insulators and semiconductors, laser materials, dielectric breakdown, structural aspects of superconducting materials, ferromagnetism and magnetic materials. At the level of *Physics of Semiconductor Devices* by Sze, *Ferromagnetism* by Bozworth, and current review articles.

702 Amorphous and Semicrystalline Materials 3 credits. Prerequisite: Physics 454 or equivalent.
Topics related to the science of the amorphous state selected from within the following general areas: structure of liquids and polymers; rheology of elastomers and glasses; electrical, thermal, and optical properties of amorphous materials. Presented at the level of *Modern Aspects of the Vitreous State* by Mackenzie, *"Glass Transitions"* by Shen and Eisenberg in *Progress in Solid State Chemistry*, and *The Physics of Rubber Elasticity* by Treloar.

703 Physics of Solid Surfaces (also A&EP 762) 3 credits. Prerequisites: MS&E 601 and some knowledge of solid-state physics.
See A&EP 762 for course description.

704 Advanced Topics in Crystal Defects 3 credits. Prerequisites: MS&E 601, 602, and 603, or equivalent.
The structure and properties of point, line, and planar crystal defects treated from a fundamental point of view. Thermodynamics and kinetics of point defects. Atomistic and continuum theories of dislocations. Thermodynamic treatment of grain boundaries. Structure of grain boundaries. Emphasis given throughout to interactions between the various types of defects and to their roles in important phenomena such as diffusion, precipitation, plasticity, radiation damage.

705 Nuclear Materials 3 credits.
The physical processes that occur in metals and ceramics as a result of their use in nuclear reactor construction. Emphasis is on the effects of temperature, neutron fluence, stress, and corrosive environment on the structural response of both core materials and other materials used in nuclear power stations. Discussion is confined to fission reactors, with an introduction to the behavior of materials in fusion reactors.

706 Amorphous Semiconductors 2 credits. Prerequisite: knowledge of the theory of crystalline semiconductors on the level of Kittel.
The preparation, characterization, and the electronic transport of amorphous semiconductors from an experimental point of view. Particular emphasis is given to amorphous, hydrogenated Si. Some potential device applications, such as in amorphous Si solar cells and the metal-base transistor, are described.

707 Solar Energy Materials 3 credits. 3 lec.
Photovoltaic energy conversion: (1) theory (on the level of Hovel); (2) the role of crystal defects and grain boundaries on the conversion efficiency, and schemes to passivate these defects; (3) current investigations in the JPL program to produce large quantities of solar-grade semiconducting Si.

775 Advanced Topics in Mechanical Properties 3 credits. 3 lec. Prerequisite: MS&E 604 or permission of instructor.
Topics from current research in mechanical properties of structural materials, selected from the following: modern theories of deformation, high-stength alloys, effects of nuclear radiation, amorphous solids, cyclic deformation and fatigue, fracture of brittle and ductile solids, anelasticity and internal friction. Lectures are based largely on current literature.

779 Special Studies in Materials Science Fall or spring. Credit variable.
Supervised studies of special topics in materials science.

Mechanical and Aerospace Engineering

101 Naval Ship Systems Spring. 3 credits. Limited to freshmen and sophomores.
R. L. Wehe.
An introduction to primary ship systems and their interrelation. Basic principles of ship construction, stability, propulsion, control, internal communications, and other marine systems.

221 Thermodynamics Fall or spring. 3 credits. 3 rec. Prerequisites: Mathematics 191 and 192. Physics 112.
See description under Division of Basic Studies.

302 Technology, Society, and the Human Condition Spring. 3 credits. S-U grades optional. Limited to 40 upperclass engineers and other students who have received permission of instructor.
B. J. Conta.
An introduction to the history of technology from the origin of man to the present. Emphasis is on the social and human consequences of technology rather than on internal or gadget history. Of primary interest is the nineteenth and twentieth centuries and the pervasive effects of industrialization — a process that began with manufacturing and was rapidly extended to agriculture, culminating in what Ivan Illich has called the industrialization of man. Among the current topics included are the transition from an economy of abundance and affluence to one of impending shortages and limits to growth, alternative life styles, alternative energy sources and systems, and the growing interest in intermediate or appropriate technology.

305 Introduction to Aeronautics Fall. 3 credits. Limited to upperclass engineers and students who have received permission of instructor.
D. A. Caughey.
Introduction to atmospheric flight vehicles. Principles of incompressible and compressible aerodynamics, boundary layers, and wing theory. Propulsion system characteristics. Static aircraft performance; range and endurance. Elements of stability and control.

311 Materials and Manufacturing Processes (also MS&E 337) Fall or spring. 3 credits. 2 lec, 1 lab. May be taken in addition to MS&E 261. Prerequisite: T&AM 202.
Material structures. Physical and metallurgical properties of materials and their control by mechanical and metallurgical means. Manufacturing processes. Emphasis on correlations among design, material properties, and processing methods.

323 Fluid Mechanics Fall or spring. 4 credits. 4 rec. Prerequisites: M&AE 221, T&AM 202 and 203, or permission of instructor.
Statics, kinematics, potential flow, dynamics, momentum and energy relations. Thermodynamics of compressible flow; dimensional analysis; real fluid phenomena, laminar and turbulent motion; boundary layer; lift and drag; supersonic flow.

324 Heat Transfer and Transport Processes Fall or spring. 3 credits. 1 lec, 2 rec. Prerequisite: M&AE 323.
Conduction of heat in steady and unsteady situations. Fin surfaces and systems with heat sources. Emission and absorption of radiation, and radiative transfer between surfaces. Forced and natural convection of heat owing to flow around bodies and through ducts. Combined modes of transfer and heat exchangers.

325 Mechanical Design and Analysis Fall or spring. 4 credits. 3 rec, 1 lab. Prerequisites: T&AM 202 and 203.
Application of the principles of mechanics and materials to problems of analysis and design of mechanical systems.

326 Systems Dynamics Fall or spring. 4 credits. Prerequisite: M&AE 325.
Dynamic behavior of mechanical systems, modeling, analysis techniques and applications, digital- and analog-computer simulation, balancing of rotating and reciprocating machinery, vibrations of single and multi-degree-of-freedom systems, linear control systems. PDF control, stability analysis.

389 Computer-Aided Design Spring. 3 credits. 2 lec-rec, 1 computing lab; term project. Limited to juniors and seniors.
A broad introduction to computational methods in mechanical design.

415 Mechanical Behavior of Solids Spring. 3 credits. Prerequisite: T&AM 202.
S. Jahanmir.
Response of engineering materials to external loads and displacements. Quantitative treatment of macroscopic behavior. Elastic, plastic, and viscoeleastic deformations in metals and polymers. Creep, fatigue, and fracture.

439 Acoustics and Noise Spring. 3 credits. Prerequisite: some knowledge of fluid mechanics or permission of instructor.
A. R. George.
Sound propagation, transmission, and absorption. Sound radiation by surfaces and flow. Loudspeakers. Hearing, noise, and noise control criteria. Architectural acoustics and noise control techniques.

449 Combustion Engines Fall. 3 credits. 3 rec. Prerequisite: M&AE 221.
Introduction to combustion engines, with emphasis on application of thermodynamics and fluid dynamics and on control of undesirable exhaust emissions. Emphasis on performance, efficiency, and emissions of current and future spark-ignited and diesel reciprocating engines. Discussion of alternative engines and fuels.

453 Mechanical Engineering Laboratory Fall. 4 credits. 1 lec, 2 labs. Prerequisites: M&AE 325, 323, and concurrent registration in M&AE 326 and 324.
Laboratory exercises in instrumentation, techniques, and methods in mechanical engineering. Measurements of pressure, temperature, heat flow, drag, fluid flow rate, solar energy, thermoelectricity, displacement, force, stress, strain, vibrations, noise, etc.

459 Plasma Energy Systems Spring. 3 credits. Prerequisite: Physics 214.
Fundamental aspects of plasma physics. An elementary treatment of principles on which the concepts of controlled thermonuclear (fusion) reactors are based. Comparisons between fission and fusion systems and treatment of other plasma devices (e.g., MHD converters) as time permits.

464 Design for Manufacture Fall. 3 credits. Prerequisite: M&AE 311 or permission of instructor. Design for casting, forging, stamping, welding, machining, heat treatment, and assembly; beneficial prestressing; improving the distribution of loads and deflections. Selection of materials; dimensioning and fits; joints, fasteners, and shaft mountings. Specifications for manufacturing and maintenance to minimize fatigue failures and improve reliability. Short design problems.

483 Mechanical Reliability Spring. 3 credits. Prerequisite: OR&IE 260 or 270 or equivalent.
S. L. Phoenix.
Classic system reliability, hazard function concepts, reliability bounds; static and time-dependent material strength models, static and dynamic fatigue, weakest flaw models; structural system reliability, static and time-dependent parallel member models. Monte Carlo simulation of structural systems with load sharing.

486 Automotive Engineering Spring. 3 credits. Prerequisite: M&AE 325.
Selected topics in the analysis and design of vehicle components and vehicle systems. Emphasis is on automobiles, trucks, and related vehicles. Powerplant, driveline, brakes , suspension, and structure. Other vehicle types may be considered.

490 Special Investigations in Mechanical and Aerospace Engineering Fall or spring. Credit to be arranged. Prerequisite: permission of instructor. Intended for an individual student or a small group of students who wish to pursue a particular analytical or experimental investigation outside of regular courses, or for informal instruction supplementing that given in regular courses.

506 Aerospace Propulsion Systems. Spring. 3 credits. 3 rec. Prerequisite: M&AE 323 or permission of instructor. Offered alternate years.
F. C. Gouldin.
Application of thermodynamics and fluid mechanics to design and performance of thermal-jet and rocket engines. Mission analysis in space. Auxiliary power supply; study of advanced methods of space propulsion.

507 Dynamics of Flight Vehicles Spring. 3 credits. Prerequisites: M&AE 305 and T&AM 203 or permission of instructor. Offered alternate years.
D. A. Caughey.
Introduction to stability and control of atmospheric flight vehicles. Review of aerodynamic forces and methods for analysis of linear systems. Static stability and control. Small disturbance equations of unsteady motion. Dynamic stability and transient control response. At the level of *Stability and Control of Airplanes and Helicopters* by Seckel.

512 Analysis of Manufacturing Processes (also MS&E 338) Spring. 3 credits. 3 lec. Prerequisite: M&AE 311.
Analytical treatment of metal cutting and metal forming processes; conventional and nontraditional manufacturing methods; production systems and machine tool dynamics.

513 Materials Engineering (also MS&E 447) Spring. 3 credits. Prerequisite: M&AE 311 or MS&E 261 or permission of instructor.
Designed to aid in the design, selection, and use of engineering materials. Theory and practice of extractive, physical, and mechanical metallurgy. Corrosion principles and control; metallurgical failure analysis and prevention; mechanical properties of polymers, ceramics, and composite materials.

514 Numerical Control in Manufacturing Fall. 3 credits. 3 lec.
K. K. Wang.
Principles and the state of the art of numerical control (NC) technology; programming methods of NC machine tools; economic aspects and computer-aided manufacturing systems.

536 Turbomachinery Spring. 3 credits. 3 rec. Prerequisite: M&AE 323 or permission of instructor. Aerothermodynamic design of turbomachines in general; energy transfer between fluid and rotor in specific types, axial and radial units, compressible flow, 3-D effects, surging.

543 Combustion Processes Spring. 3 credits. 3 rec. Prerequisites: M&AE 323, 324.
An introduction to combustion and flame processes with emphasis on fundamental fluid dynamics, heat and mass transport, and reaction-kinetic processes that govern combustion rates. Both premixed and diffusion flames are considered.

554 Environmental Energy Systems Fall. 3 credits. Prerequisites: M&AE 221 and 323.
Environmental living systems; heating, cooling, air conditioning. Solar heating. Refrigeration, cryogenic systems, artificial environments, and life-support systems. Energy conservation considerations. Environmental effects of technological thermal sources.

555 Direct Energy Conversion Spring. 3 credits. 3 lec. Prerequisite: M&AE 221 or equivalent. Offered alternate years.
Primarily a survey of methods for the direct conversion of heat into electrical energy, with emphasis on efficiency, maximum power, practical applications, and limitations. Thermoelectric generators and refrigerators. Thermionic generators. Solar cells. Magneto-fluid-dynamic generators. Fuel cells.

556 Power Systems I Fall. 3 credits. Prerequisite: M&AE 323 or equivalent.
F. K. Moore.
A broad survey of methods of large-scale power generation, emphasizing energy sources, thermodynamic cycle considerations, and component description. Power industry, economic, and environmental factors. Trends and projections.

557 Power Systems II Spring. 3 credits. Prerequisite: some energy-related course or permission of instructor.
F. K. Moore.
Options for future power generation: costs, feasibilities, benefits, impacts; hydrogen, solar, geothermal, wind, and MHD are examples. Environmental and siting issues. Problems of scale; "power parks." Uses of waste heat. Energy storage. Seminar format based on study projects reflecting student preparation and interests.

560 Transport Phenomena and Living Systems (also Chemical Engineering 630) Spring. 3 credits. Prerequisites: M&AE 221, 323, 324, or equivalent.
R. L. Levin.
Study of mass, momentum, and energy transport within biological systems. Mass transport through biological and artificial membranes: diffusion, osmosis, solute flow, ion flow, active transport. Momentum transport: biorheology, flow of particulate suspensions, pulsate flow in ducts. Bioheat transport: thermal modeling and properties of biomaterials, thermal interactions between the human body and the environment, cryobiology, and cryosurgery. Examples will be drawn from areas of current biomedical engineering interest: heart-lung machines, kidney dialysis machines, artificial organs, and surgical cryostats.

563 Mechanical Components Spring. 3 credits. Prerequisite: M&AE 325.
Advanced analysis of machine components and structures. Application to the design of new configurations and devices. Selected topics from the following: lubrication theory and bearing design, fluid drives, shells, thick cylinders, rotating disks, fits, elastic-plastic design, thermal stresses, creep, impact, indeterminate and curved beams, plates, contact stresses.

565 Biomechanical Systems — Analysis and Design Spring. 3 credits. 3 rec; term project. Prerequisites: T&AM 202 and 203.
D. L. Bartel.
Selected topics from the study of the human body as a mechanical system. Emphasis on the modeling, analysis, and design of biomechanical systems frequently encountered in orthopedic surgery and physical rehabilitation.

569 Mechanical and Aerospace Structures I Fall. 3 credits. Prerequisite: M&AE 325 or permission of instructor.
A study of advanced topics in the analysis of stress and deformation of deformable bodies with applications to the analysis and design of mechanical and aerospace systems. Topics selected from advanced strength of materials, energy methods in stress analysis, strength theories, and experimental stress analysis.

577 Mechanical Vibrations Spring. 3 credits. 2 rec, 1 lab. Open to qualified undergraduates. Prerequisite: M&AE 326 or equivalent.
Further development of vibration phenomena in single-degree and multidegree of freedom linear and nonlinear systems, with emphasis on engineering problems involving analysis and design.

578 Feedback Control Systems Fall. 3 credits. 2 rec, 1 lab. Open to qualified undergraduates. Prerequisite: M&AE 326 or equivalent.
R. M. Phelan.
Further development of the theory and implementation of feedback control systems, with particular emphasis on the application of pseudo-derivative-feedback (PDF) control concepts to linear and nonlinear systems.

581 Friction and Wear of Materials (also MS&E 611) Offered on demand. 3 credits. Prerequisite: M&AE 311 or MS&E 261 or equivalent. Limited to seniors who have received permission of instructor.
S. Jahanmir.
Fundamental aspects of friction and generation of heat in sliding systems. Wear mechanisms in metals and polymers with special emphasis on the role of microstructure and mechanical properties. Friction and wear in some specific applications such as metal processing, bearings, gears, cams, and biomechanical systems. New methods of monitoring wear in machinery and measures to control friction and wear.

587 Dynamics of Vehicles Fall. 3 credits. Prerequisite: T&AM 203. Offered alternate years.
Introduction to the dynamics of ground vehicles including cars, trucks, trailers, motorcycles, and railroad vehicles. Emphasis is on the handling behavior and stability of the automobile, tire theory, and suspension analysis. Performance and comfort criteria are developed. Further topics are included to reflect interests of the class.

588 Tribology: Friction, Wear, and Lubrication Fall. 3 credits. Prerequisites: M&AE 311 and 325 or permission of instructor. Offered alternate years.
J. F. Booker, S. Jahanmir.
Tribology is the study of friction, wear, and lubrication of engineering surfaces, with a view to both understanding and controlling basic mechanisms. Mechanical engineering applications include design analysis and material selection for processes (such as cutting, forming, rolling, and drawing) and for devices (such as gears, cams, and bearings) involving surface interactions.

590 Mechanical Engineering Design Project Fall and spring. 3 credits each term. Intended for students in M. Eng (Mechanical) degree program.

Design of an engineering system or a device of advanced nature. Projects by individuals or small groups, sometimes in collaboration with an external organization.

592 Seminar and Design Project in Aerospace Engineering Fall and spring. 2 credits each term. Intended for students in master's degree programs in aerospace engineering.
Study and discussion of topics of current research interest in aerospace engineering. Individual design projects.

602 Incompressible Aerodynamics Spring. 3 credits. Intended for graduate students interested in fluid dynamics or aerodynamics research. Open to qualified undergraduates with permission of instructor.
Basic equations, vorticity and flow development. Incompressible potential flow theory; singularity distributions, airfoil, wing, and slender body theory, complex-variable methods, unsteady phenomena.

603 Compressible Aerodynamics Fall. 3 credits. Prerequisite: M&AE 632 or equivalent. Open to qualified undergraduates who have received permission of the instructor.
Basic conservation laws and fundamental theorems of compressible fluid flow. Shock waves, method of characteristics, wave interactions. Perturbation theories and similarity rules. Expansion procedures and singular perturbation problems. Linearized supersonic flow, wing theory, wave drag. Nonlinear theories of transonic and supersonic flow.

608 Physics of Fluids I Fall. 3 credits.
Elementary kinetic theory of gases and a microscopic derivation of the Navier-Stokes equations. Statistical mechanics and applications to gas reactions. Elementary chemical kinetics as related to pollution studies.

609 Physics of Fluids II Spring, on demand. 3 credits.
Molecular structure bonding theory, heats of reaction. Atomic and molecular spectroscopy, applications to pollution. Nonequilibrium statistical mechanics; Boltzmann equation, H-theorem, review of Hilbert-Enskog-Chapman theory, fluctuations. Onsager's relations. Radiative transfer; lasers. At the level of *The Dynamics of Real Gases* by Clarke and McChesney.

610 Gasdynamics Spring. 3 credits. Offered alternate years.
E. L. Resler, Jr.
A survey of the nonlinear theory of characteristics as applied to two-dimensional steady supersonic flows and one-dimensional unsteady flows. The role of chemical reactions in these flows is treated, as well as experimental techniques to measure chemical reaction rates. Among the topics treated are heat capacity lag and its effects on acoustics, gasdynamic lasers, and shock-tube techniques. Magnetically driven shock waves are also considered, if time permits.

622 Introductory Magnetohydrodynamics Offered on demand. 3 credits.
E. L. Resler, Jr.
Basic equations of magnetohydrodynamics. Tensor conductivity and MHD power generation. Aerodynamic flow problems. Plasma waves studied as a continuum. Hydromagnetic shock waves.

630 Atmospheric Turbulence and Micrometeorology Spring. 3 credits. Offered alternate years. Prerequisites: permission of instructor, knowledge of the Navier-Stokes equations, familiarity with elementary statistical methods. Open to qualified undergraduates.
Z. Warhaft.
Basic problems associated with our understanding of the structure of the velocity field and the transport of scalars such as temperature and moisture in the lower atmosphere, from both theoretical and experimental viewpoints. Topics include the second-order turbulence equations and their closure, Monin-Obukhov theory, diffusion of scalars, spectral characteristics of atmospheric variables, experimental techniques including remote sensing, and the analysis of random time series.

632 Theoretical Fluid Mechanics and Aerodynamics I Fall. 3 credits.
Introduction to the mechanics of fluids. Derivation of the Navier-Stokes equations. Boundary conditions. Exact solutions. Vorticity theorems. Methods of solution of irrotational flows. Rotational flows. Boundary layer theory. Exact methods of solution of the boundary layer equations.

633 Theoretical Fluid Mechanics II Spring. 3 credits.
Approximate methods in boundary layer theory. Heat transfer. Buoyancy-driven flows. Stability of fluid flow. Introduction to turbulent flows. Dynamics and thermodynamics of compressible flows. Sound waves. Subsonic and supersonic flow.
One-dimensional steady flows. One-dimensional unsteady flows, method of characteristics, shock waves.

648 Seminar on Combustion Spring. 3 credits. 3 rec to be arranged. Prerequisite: permission of instructor. Offered alternate years.
Discussion of contemporary problems in combustion research with emphasis on applications of modern experimental and analytical techniques. Typical problems include formation and removal of pollutants in combustion systems, combustion of alternative fuels, coal combustion, and modification of combustion systems for energy efficiency improvement.

650 Transport Processes I Fall. 3 credits. Prerequisite: M&AE 324 or permission of instructor.
K. E. Torrance.
Advanced treatment of heat conduction and thermal radiation. Differential and integral conduction equations. Exact and approximate solutions; superposition; phase change boundaries. Radiative transport equation and Kirchhoff's laws. Emission and scattering by real surfaces and by gases. Heat exchange in enclosures.

651 Transport Processes II Spring. 3 credits. Prerequisites: M&AE 323, 324, or permission of instructor.
Advanced convection heat transfer. Integral and differential formulations. Basic equations reasoned in detail. Exact and approximate solutions. Natural convection. Forced convection. Laminar, transitional, and turbulent flows. Effects of variable properties, viscous dissipation, and compressibility. Mass transfer. Boiling and condensation.

653 Experimental Methods in Fluid Mechanics and Combustion Fall. 3 credits. 2 lec, 1 lab.
F. C. Gouldin.
Study of experimental techniques and data analysis procedures for investigation of fluid and combustive systems, with emphasis on experimental capabilities, underlying principles, and statistical treatment of data. Topics include laser velocimetry, hot-wire anemometry, and spectroscopy.

670 Mechanical and Aerospace Structures II Spring. 3 credits. Term project. Prerequisite: M&AE 569 or permission of instructor.
J. F. Booker.
Introduction to modern computational methods for static and dynamic analysis of mechanical and aerospace structures. Emphasis on underlying mechanics and mathematics. Discussion of inherent capabilities and limitations of general-purpose structural mechanics programs (e.g., NASTRAN).

672 Experimental Methods in Machine Design Fall. 3 credits. 1 rec, 2 labs. Prerequisite: M&AE 325 or equivalent.
Investigation and evaluation of methods used to obtain design and performance data. Photoelasticity, strain measurement, photography, vibration and sound measurements, transducers.

[676 Advanced Mechanical Vibrations Fall. 3 credits. Prerequisite: M&AE 577 or equivalent. Offered alternate years. Not offered 1979–80.
D. L. Taylor.
Vibratory response of multi-degree-of-freedom systems, matrix formulation, concepts of impedance, mobility, frequency response, and complex mode shapes. State-of-the-art techniques such as FFT, sine sweep, and single-point random excitation. Nonlinear vibrations, limit cycle analysis, parametric resonance, self-excited oscillations, and nonconservative systems. Random vibrations and stochastic excitation. Introduction to vibrations of elastic bodies.]

[679 Digital Simulation of Dynamic Systems Fall. 3 credits. Open to qualified undergraduates by permission of instructor. Prerequisite: previous exposure to systems dynamics and digital programming. Offered alternate years. Not offered 1979–80.
J. F. Booker.
Modeling and representation of physical systems by systems of ordinary differential equations in vector form. Applications from diverse fields. Simulation diagrams. Analog and digital simulation by direct integration. Problem-oriented digital-simulation languages (e.g., CSMP). Digital analysis of stability and response of large linear systems.]

680 Design of Complex Systems Offered on demand. 3 credits. Two 2-hour meetings. Prerequisite: permission of instructor.
R. L. Wehe.
Seminars rely heavily on student participation in discussing frontier problems such as systems for space and underwater exploitation, salt water conversion, and transportation. Reports including recommendations and the reasoning that led to them are required.

682 Hydrodynamic Lubrication Offered on demand. 3 credits.
J. F. Booker.
Designed to acquaint those having a general knowledge of solid and fluid mechanics with the special problems and literature currently of interest in various fields of hydrodynamic lubrication. General topics include equations of viscous flow in thin films, self-acting and externally pressurized bearings with liquid and gas lubricant films, bearing-system dynamics, and computational methods. Also selected special topics.

684 Advanced Mechanical Reliability Fall. 3 credits. Prerequisite: M&AE 483 or permission of instructor. Offered alternate years.
S. L. Phoenix.
Advanced course in random loading and statistical failure processes in mechanical systems. Continuous and discrete random loadings, random vibrations of mechnical structures, random fatigue processes in materials, order statistics and statistical estimation, reliability, simulation, and computation in mechanical structures, coherent systems and monotone load-sharing, stochastic failure of bundles and composites.

685 Optimum Design of Mechanical Systems Spring. 3 credits. 3 rec. Prerequisite: graduate standing or permission of instructor.
D. L. Bartel.
The formulation of design problems frequently encountered in mechanical systems as optimization problems. Theory and application of methods of mathematical programming for the solution of optimum design problems.

690 Special Investigations in Mechanical and Aerospace Engineering Fall or spring. Credit to be arranged. Limited to graduate students.

704 Theory of Viscous Flows Spring. Offered on demand. 3 credits. Prerequisite: M&AE 632 or equivalent.
S. F. Shen.
A systematic study of laminar flow phenomena and methods of analysis. Exact solutions of the Navier-Stokes equations. The small Reynolds number approximation. Matched asymptotic expansion. The boundary layer approximation; general properties. Transformations for compressibility and axisymmetric effects. Approximate methods of calculation. Unsteady problems. Stability of laminar flows.

707 Aerodynamic Noise Theory Offered on demand. 3 credits. Prerequisites: M&AE 632 or permission of instructor.
Advanced topics in acoustics relevant to aerodynamic and transportation noise sources and control. Random processes. Geometrical acoustics in inhomogeneous moving media. Kirchhoff and Poisson formulas, diffraction, scattering. Lighthill-Curle formulations for sound generation. Absorption and transmission in fluids and at boundaries. Applications to aerodynamic noise sources.

734 Turbulence and Turbulent Flow Fall. 3 credits.
J. L. Lumley.
Topics include the dynamics of buoyancy and shear-driven turbulence, boundary-free and bounded shear flows, second-order modeling, the statistical description of turbulence, turbulent transport, and spectral dynamics.

735 Dynamics of Rotating Fluids Offered on demand. 3 credits. Prerequisites: M&AE 632–633.
S. Leibovich.
Review of classical fluid mechanics. Rotating coordinate systems. Linearized theory for rapidly rotating fluids. Inviscid regions, viscous layers. Spinup. Motions past objects. Waves in rotating fluids. Motions in concentrated vortices. "Vortex breakdown" in swirling flows. Boundary layer interactions.

737 Numerical Methods in Fluid Flow and Heat Transfer Spring. 3 credits. Prerequisites: M&AE 323, 324 and some FORTRAN programming.
K. E. Torrance.
Discretization procedures for the Navier-Stokes and scalar transport equations. Finite differences and finite elements. Analysis of accuracy, stability, and convergence. Survey and comparison of current methods with applications. Assigned problems are solved with a digital computer.

738 Nonlinear Wave Propagation Offered on demand. 3 credits.
S. Leibovich.
Mathematical treatment of nonlinear effects associated with waves in continua. Examples are taken primarily from geophysical fluid dynamics and gas dynamics. Methods of averaging, variational methods, wave interactions, and exact solutions of nonlinear evolution equations.

791 Mechanical and Aerospace Engineering Research Conference Fall and spring. 1 credit each term.
For graduate students involved in research projects. Short presentations on research in progress by students and staff.

795 Special Topics in Mechanical and Aerospace Engineering Fall or spring. Credit arranged. Lecture or seminar format. Prerequisite: permission of instructor.
Topics of current importance in mechanical and aerospace engineering and research. More than one topic may be taken if offered.

799 Mechanical and Aerospace Engineering Colloquium Fall and spring. 1 credit each term. Credit limited to graduate students. All students and staff invited to attend.
Lectures by Cornell staff members, graduate students, and visiting scientists on topics of interest in mechanical and aerospace science, especially in connection with new research.

890 Research in Mechanical and Aerospace Engineering Credit to be arranged. Prerequisite: candidacy for M.S. degree in mechanical or aerospace engineering, or approval of the director. Independent research in an area of mechanical and aerospace engineering under the guidance of a member of the staff.

990 Research in Mechanical and Aerospace Engineering Credit arranged. Prerequisite: candidacy for Ph.D. degree in mechanical or aerospace engineering or approval of the director. Independent research in an area of mechanical and aerospace engineering under the guidance of a member of the staff.

Nuclear Science and Engineering

A number of courses in nuclear science and engineering are offered through the School of Applied and Engineering Physics; see A&EP 303, 304, 609, 612, 613, 633, 634, 636, 638, 651, and 652.

605 Interaction of Radiation and Matter Spring. 4 credits. 3 lec. Prerequisite: a course in modern physics including quantum mechanics.
V. O. Kostroun.
Quantization of the electromagnetic field; relativistic wave equation of the electron; electrons interacting with radiation field — emission, absorption, dispersion, photoelectric effect, Compton scattering, scattering of two electrons, bremsstrahlung, pair production, and annihilation; passage of heavy charged and neutral particles through matter. Examples and applications from low-energy nuclear, plasma, and solid-state physics.

Operations Research and Industrial Engineering

213 Systems Analysis and Design Fall. 3 credits. 2 lec, 1 rec. Prerequisite: first-year calculus.
See description under Division of Basic Studies.

260 Introductory Engineering Probability Fall or spring. 3 credits. 3 lec. Prerequisite: first-year calculus.
See description under Division of Basic Studies.

270 Basic Engineering Statistics Fall or spring. 3 credits: 2 lec, 1 rec. Prerequisite: First-year calculus.
See description under Division of Basic Studies.

320 Optimization I Fall. 4 credits. 3 lec, 1 rec. Prerequisite: Mathematics 293 or 221.
Formulation of linear programming problems and solution by the simplex method. Related topics such as sensitivity analysis, duality, and network programming. Applications include such models as resource allocation and production planning.

321 Optimization II Spring. 3 credits. 2 lec, 1 rec. Prerequisite: OR&IE 320 or equivalent.
A variety of optimization methods, stressing extensions of linear programming and its applications but also including topics drawn from integer, dynamic, and nonlinear programming. Formulation and modeling are stressed, as well as numerous applications. The computer is used in solving typical problems.

350 Cost Accounting, Analysis, and Control Fall or spring. 4 credits. 3 lec, 1 computing-disc.
Principles of accounting, financial reports; job order and process cost systems — historical and standard costs; cost characteristics and concepts for control, analysis, and decision making.

361 Introductory Engineering Stochastic Processes I Spring. 4 credits. 3 lec, 1 rec. Prerequisite: OR&IE 260 or equivalent.
Basic concepts and techniques of random processes are used to construct models for a variety of problems of practical interest. Topics include the Poisson process, Markov chains, renewal theory, models for queueing and reliability.

370 Introduction to Statistical Theory with Engineering Applications Fall or spring. 4 credits. 3 lec, 1 rec. Prerequisite: OR&IE 260 or equivalent.
Provides a working knowledge of basic statistics as it is most often applied in engineering and a basis in statistical theory for continued study. Topics include a review of distributions of special interest in statistics; testing simple and composite hypotheses; point and interval estimation; correlation; linear regression; curve fitting.

383 Introduction to Simulation and Database Systems Spring. 4 credits. 2 lec, 1 rec; substantial programming exercises. Prerequisite: Computer Science 211.
First third of course concerns discrete-event simulation: problems of modeling, programming, and experimental investigation. Balance of course is an introduction to modern database systems: basic models of file organization and access strategies and problems of file maintenance and information retrieval.

410 Industrial Systems Analysis Fall. 4 credits. 3 lec, 1 computing session. Prerequisites: OR&IE 350 and 370.
Engineering economic analysis, including engineering economy, replacement, taxation effects, decision making based on economic considerations. Operations analysis including process flow, process evaluation, procedural analysis, resource layout, methods analysis and design, work measurement, job evaluation, quality control elements. Project planning and control.

[417 Layout and Material Handling Systems Spring. 2 lec, 1 rec. Prerequisites: OR&IE 361 and 383. Not offered 1979–80.
Design of the layout of processes and storage areas and the material handling system for movement of items. Typical equipment used. The functions of identification, control, storage, movement, batching, merging, and dispersion. Introduction to new technologies.]

421 Production Planning and Control Spring. 4 credits. 3 lec. Prerequisites: OR&IE 320 and 361 or permission of instructor.
Planning and control of large-scale production operations. Inventory control. Leveling, smoothing, and scheduling of production. Job shop scheduling and dispatching. Demand forecasting. Economic and practical interpretation of planning and control procedures.

431 Discrete Models Spring. 3 credits. 3 lec-rec.
Basic concepts of graphs, networks, and discrete optimization. The use of finite mathematical techniques to model contemporary problems selected from operations research, including voting procedures and decision making, efficient and equitable allocations, energy and environment, traffic and urban systems.

[432 Introductory Nonlinear Programming
Spring. 3 credits. 2 lec, 1 rec. Prerequisites: OR&IE 320, Computer Science 100. Not offered 1979–80.
Optimization techniques involving nonlinear functions. Stress is on solution methods such as one-dimensional search, steepest-descent and second-order methods for unconstrained optimization; penalty, barrier, cutting-plane and feasible-direction methods for constrained optimization.]

435 Introduction to Game Theory Fall. 3 credits. 3 lec.
A broad survey of the mathematical theory of games, including such topics as two-person matrix and bimatrix games; cooperative and noncooperative n-person games; games in extensive, normal, and characteristic function form. Economic market games. Structure theory for games arising from complex organizations.

[462 Introductory Engineering Stochastic Processes II Fall. 4 credits. 3 lec, 1 rec. Not offered 1979–80. Prerequisite: OR&IE 361 or equivalent.
A selection of topics from the following: Time series, Markov and semi-Markov processes, optimal stopping; examples and applications are drawn from several areas.]

471 Applications of Statistics to Engineering Problems Fall. 4 credits. 3 lec, 1 rec. Prerequisite: OR&IE 370 or equivalent.
Sample size calculations for one- and two-sample tests; theory of multiple linear regression and applications to problems in engineering and the sciences, including graphic and analytic techniques useful in model building; analysis of data from experiments with qualitative factors including one-way and two-way Anova models. Use of the computer as a tool for statistics is stressed.

[472 Statistical Decision Theory Spring. 3 credits. 3 lec. Prerequisite: OR&IE 471 or equivalent. Not offered 1979–80.
Same topics as OR&IE 672, with emphasis on applications in sampling inspection, inventory control, estimation of parameters, testing hypotheses.]

516 Mathematical Models — Development and Application Fall. 4 credits. 4 rec-labs. Prerequisites: OR&IE 320 and 361 or permission.
A laboratory course concerned with structuring problems and operational systems as mathematical models. A sequence of situations for which students must construct representative models is considered. Models are examined for their usefulness in analysis, synthesis, and design.

519 Industrial Engineering Field Work Fall or spring. Credit arranged. Prerequisite: permission of instructor.
Project-type work, under faculty supervision, on a real problem existing within some firm or institution, usually a regional organization. Opportunities in the course may be discussed with the associate director.

551 Advanced Engineering Economic Analysis Spring. 4 credits. 3 lec, 1 rec. Prerequisites: OR&IE 350 and knowledge of linear programming and statistics, or permission of instructor.
The economics of production. Topics concerning economic decision making at the level of the firm include long-range planning, budgeting and control, and project investment decisions under certainty and uncertainty. Topics in industrial economics include productivity, technical change, and industrial development.

[561 Queueing Theory and Its Applications Fall. 3 credits. 3 lec. Prerequisite: OR&IE 361 or permission. Not offered 1979–80.
Basic queueing models. Design and control of queueing systems. Statistical inference from queueing processes. Solution techniques (including simulation). Scheduling and equipment maintenance. Highway and urban traffic networks. Analysis of computer systems.]

562 Inventory Theory Fall. 4 credits. 3 lec, 1 rec. Prerequisite: OR&IE 320 and 361.
Discussion of the nature of inventory systems and their design and control. Periodic and continuous review policies for single-item and single-location problems. Multi-item and multi-echelon extensions. Dynamic and static models are discussed. Redistribution methods are analyzed. Applications are stressed.

563 Applied Time Series Analysis Fall. 3 credits. 2 lec, 1 rec, final project. Prerequisite: OR&IE 361, Computer Science 211, or permission of instructor.
Box-Jenkins models, which are versatile, widely used, and applicable to nonstationary and seasonal time series, are covered in detail. The various stages of model identification, estimation, diagnostic checking, and forecasting are treated. Long-range dependence models and the related statistics are considered. As time permits, other topics such as spectral analysis, filtering, the sampling and aliasing problem, and the fast Fourier transform algorithm will be discussed. Applications to economics and hydrology are emphasized. Assignments require computer work.

570 Statistical Methods in Quality and Reliability Control Spring. 3 credits. 3 lec. Prerequisite: OR&IE 370 or equivalent.
Control concepts and methods for attributes and variables; process capability analysis; acceptance sampling plans; elementary procedures for variables; acceptance-rectification procedures. Reliability concepts; exponential and normal distributions in reliability; life and reliability analysis of components and systems; redundancy.

599 Project Fall and spring. 5 credits. For M.Eng. students.
Identification, analysis, design, and evaluation of feasible solutions to some applied problem within the OR&IE field. A formal report and oral defense of the approach and solution are required.

[614 Facilities Location and Design Spring. 3 credits. 3 lec-rec. Prerequisite: OR&IE 320 or 622 or permission of instructor. Not offered 1979–80.
Formulation, analysis, and solution techniques for location and facility design problems. Applications in industrial, environmental, and regional arenas.]

622 Operations Research I Fall. 3 credits. 3 lec-rec. Not open to students who have had OR&IE 320.
Survey of deterministic models. Models are drawn from linear, mixed-integer, nonlinear and dynamic programming. Network theory, game theory, and deterministic inventory models. Modeling and applications are stressed.

623 Operations Research II Spring. 3 credits. 3 lec-rec. Prerequisite: OR&IE 260 or 270 or permission of instructor. Not open to students who have had OR&IE 361.
Models of inventory and production control, Markov decision models, queueing theory and its applications. Simulation. Illustrative examples and problems.

625 Scheduling Theory Spring. 3 credits. 3 lec-rec. Prerequisite: permission of instructor.
Scheduling and sequencing problems. Single resource scheduling, parallel processing, flow shop scheduling. Methodology is drawn from dynamic and integer programming; simulation techniques and heuristic methods.

626 Advanced Production and Inventory Planning Spring. 3 credits. 3 lec.
Introduction to a variety of production and distribution planning problems; the development of mathematical models corresponding to these problems; a study of approaches for finding solutions.

630–631 Mathematical Programming I and II 630, fall; 631, spring. 3 credits each term. 3 lec. Prerequisite: advanced calculus.
A rigorous treatment of the theory and computational techniques of linear programming and its extensions. Formulation, duality theory, simplex, and dual simplex methods. Sensitivity analysis. Network flow problems and algorithms. Theory of polyhedral convex sets, systems of linear equations and inequalities, Farkas' Lemma. Exploiting special structure in the simplex method, computational implementation. Decomposition Principle. Introduction to integer and nonlinear programming and game theory.

632 Nonlinear Programming Fall. 3 credits. 3 lec. Prerequisite: OR&IE 630.
Necessary and sufficient conditions for unconstrained and constrained optima. Computational methods, including interior (e.g., penalty functions), boundary (e.g., gradient projection), and exterior (e.g., cutting plane) approaches.

[635 Game Theory I Fall. 3 credits. 3 lec. Prerequisite: Mathematics 411 or permission of instructor. Not offered 1979–80.
The minimax theorem for two-person zero-sum games. Two-person general sum games and noncooperative n-person games; Nash equilibrium points. Cooperative n-person games; the core, stable sets, Shapley value, bargaining set, kernel, nucleolus.]

[637 Dynamic Programming Fall. 3 credits. 3 lec. Prerequisite: concurrent registration in OR&IE 660 and Mathematics 411 or equivalent. Not offered 1979–80.
Optimization of sequential decision processes. Deterministic and stochastic models, infinite horizon Markov decision models, policy iterations. Contraction mapping methods. Applications drawn from inventory theory, production control; discrete combinatorial examples.]

[639 Convex Analysis Fall. 3 credits. 3 lec. Prerequisite: Mathematics 411 and 431 or permission of instructor. Not offered 1979–80.
The theory of finite dimensional convex sets is developed through the study of real valued convex functions and Fenchel duality. Separation of convex sets, polarity correspondences, recession cones, theorems of Helly and Caratheodory.]

641 Integer Programming Spring. 3 credits. 3 lec. Prerequisite: OR&IE 630.
Discrete optimization. Linear programming in which the variables are restricted to be integer-valued. Theory, algorithms, and applications. Cutting plane methods, enumerative methods, and group theoretic methods; additional topics are drawn from recent research in this area.

643 Graph Theory and Network Flows Fall. 3 credits. 3 lec. Prerequisite: permission of instructor.
Directed and undirected graphs. Bipartite graphs. Hamilton cycles and Euler tours. Connectedness, matching, and coloring. Flows in capacity-constrained networks. Maximum flow and minimum cost flow problems.

[644 Combinatorial Optimization Spring. 3 credits. 3 lec. Prerequisite: permission of instructor. Not offered 1979–80.
Topics in combinatorics, graphs, and networks. These include matching, matroids, polyhedral combinatorics, and optimization algorithms.]

660 Applied Probability Fall. 4 credits. 3 lec, 1 rec. Prerequisite: advanced calculus.
Introduction to basic probability. The sample space; events; probability. Conditional probability.

Independence. Product spaces. Random variables. Important distributions. Characteristic functions. Convergence concepts. Limit theorems.

661 Applied Stochastic Processes Spring. 4 credits. 3 lec, 1 rec. Prerequisite: OR&IE 660 or equivalent.
An introduction to stochastic processes which presents the basic theory together with a variety of applications. Topics include Markov processes, renewal theory, random walks, branching processes, Brownian motion, stationary processes.

670 Applied Statistics Spring. 4 credits. 3 lec, 1 rec. Prerequisite: OR&IE 660 or equivalent.
Review of distribution theory of special interest in statistics: normal, chi-square, binomial, Poisson, t, and F; introduction to statistical decision theory; sufficient statistics; theory of minimum variance unbiased point estimation; maximum likelihood and Bayes estimation; basic principles of hypothesis testing, including Neyman-Pearson lemma and likelihood ratio principle; confidence interval construction.

671 Intermediate Applied Statistics Fall. 4 credits. 3 lec, 1 rec. Prerequisite: OR&IE 670 or equivalent.
Statistical inference based on the general linear model; least squares estimators and their optimality properties; likelihood ratio tests and corresponding confidence regions; simultaneous inference. Applications in regression analysis and ANOVA models. Variance components and mixed models. Correlation, ridge regression. Use of the computer as a tool for statistics is stressed.

672 Statistical Decision Theory Fall. 3 credits. 3 lec. Prerequisite: OR&IE 471 or 670 or equivalent.
The general problem of statistical decision theory and its applications. Comparison of decision rules; Bayes, admissible, and minimax rules. Problems involving sequences of decisions over time. Use of the sample cdf and other simple nonparametric methods. Applications.

[673 Nonparametric Statistical Analysis Spring. 3 credits. 3 lec. Prerequisite: OR&IE 670 or permission. Not offered 1979–80.
Estimation of quantiles, cdf's, and pdf's. Properties of order statistics and rank-order statistics. Hypothesis testing in one- and several-sample situations; sign tests; use of ranks for tests and estimation. Small and large sample properties of tests. Asymptotic distributions of test statistics. Testing goodness of fit.]

674 Design of Experiments Spring. 4 credits. 3 lec. Prerequisite: OR&IE 671 or permission.
Use and analysis of experimental designs such as randomized blocks and Latin squares; analysis of variance and covariance, factorial experiments; statistical problems associated with finding best operating conditions; response-surface analysis.

675 Qualitative Data Analysis Spring. 3 credits. Prerequisite: OR&IE 671.
Varieties of categorical data; cross classifications and contingency tables; tests for independence; multidimensional tables and log-linear models; maximum likelihood and weighted least squares estimation; tests of goodness of fit; analysis of incomplete tables; life tables; paired comparison experiments.

[676 Statistical Analysis of Life Data Fall. 3 credits. Prerequisite: OR&IE 671 or equivalent. Not offered 1979–80.
Analysis of data from reliability, fatigue, and life-testing studies in engineering; also biomedical applications. Survival distributions, hazard rate, censoring. Life tables. Estimation and hypothesis testing. Standards. Goodness of fit, hazard plotting. Covariance analysis, accelerated life testing. Multiple decrement models, competing risks. Sample size determination. Adaptive sampling.]

680 Digital Systems Simulation Fall. 4 credits. 2 lec, 1 rec. Prerequisites: Computer Science 211 and OR&IE 370 or permission of instructor.
Digital computer programs to simulate the operation of complex discrete systems in time. Modeling, program organization, random number and deviate generation, simulation languages, statistical considerations; applications to a variety of problem areas.

729 Selected Topics in Applied Operations Research Fall or spring. Credit to be arranged.
Current research topics dealing with applications of operations research.

[736 Game Theory II · Spring. 3 credits. 3 lec. Prerequisite: OR&IE 635. Not offered 1979–80.
A continuation of OR&IE 635, including in-depth treatment of some of the same topics plus such additional topics as games in extensive form, games without side payments, economic market games, and games with infinitely many players.]

738 Selected Topics in Game Theory Fall or spring. Credit to be arranged.
Current research topics in game theory.

739 Selected Topics in Mathematical Programming Fall or spring. Credit to be arranged.
Current research topics in mathematical programming.

752 Advanced Inventory Control Spring. 3 credits. 3 lec. Prerequisite: permission of instructor. Not offered 1979–80.
The theoretical foundation of inventory theory. Both single-item, single-location problems and multi-item, multi-echelon inventory systems are analyzed. Topics covered include a study of static and dynamic (s,S) policies under a variety of assumptions concerning the demand process and system structure as well as computational techniques.]

[761 Advanced Queueing Theory Fall. 3 credits. 3 lec. Prerequisite: OR&IE 660 or equivalent. Not offered 1979–80.
A study of stochastic processes arising in a class of problems including congestion, storage, dams, and insurance. The treatment will be self-contained. Transient behavior of the processes is emphasized. Heavy traffic situations are investigated.]

762 Advanced Stochastic Processes Fall. 3 credits. 3 lec. Prerequisite: OR&IE 661 or equivalent.
A selection of topics from the following: stationary processes, Levy processes, diffusion processes, point processes, martingales, regenerative phenomena, stochastic calculus, weak convergence.

764 Deterministic and Stochastic Control Spring. 3 credits. 3 lec. Prerequisite: OR&IE 661 or equivalent.
Topics include: elements of calculus of variations, Pontryagin's maximum principle, Markov decision processes, dynamic programming. Problems in filtering and prediction, production planning and inventory control, congestion phenomena, storage models, and environmental management are discussed.

769 Selected Topics in Applied Probability Fall or spring. Credit arranged.
Topics are chosen from current literature and research areas of the staff.

[773 Statistical Selection and Ranking Procedures Spring. 3 credits. 3 lec. Prerequisite: OR&IE 674 or permission. Not offered 1979–80.
A study of multiple-decision problems in which a choice must be made among two or more courses of action. Major emphasis is on selection and ranking problems involving choosing the "best" category where goodness is measured in terms of a particular parameter of interest. Statistical formulations of such problems: indifference-zone, subset, and other approaches. Single-stage, two-stage, and sequential procedures. Applications. Recent developments.]

779 Selected Topics in Applied Statistics Fall or spring. Credit to be arranged.
Topics chosen from current literature and research interests of the staff.

790 Special Investigations Fall or spring. Credit arranged. For individuals or small groups.
Study of special topics or problems.

891 Operations Research Graduate Colloquium Fall or spring. 1 credit.
A weekly 1½-hour meeting devoted to presentations by distinguished visitors, by faculty members, and by advanced graduate students, on topics of current research in the field of operations research.

893–894 Applied OR&IE Colloquium 893, fall; 894, spring. 1 credit each term.
A weekly meeting of M.Eng. students. Discussion of assigned topics; presentations by practitioners in the field.

Structural Engineering

See Civil and Environmental Engineering.

Theoretical and Applied Mechanics

Basics in Engineering Mathematics and Mechanics

105 Finite Mathematics for Biologists (also Mathematics 105) Offered by the Department of Mathematics 1979–80. Fall. 3 credits. 2 lec, 2 rec.

106 Calculus for Biologists (also Mathematics 106) Offered by the Department of Mathematics 1979–80. Spring. 3 credits. 2 lec, 2 rec.

202 Mechanics of Solids Fall or spring. 3 credits. 2 lec, 1 rec, 1 lab; evening exams. Prerequisite: coregistration in Mathematics 293.
See description under Division of Basic Studies.

203 Dynamics Fall or spring. 3 credits. 2 lec, 1 rec, 1 lab; evening exams. Prerequisites: coregistration in Mathematics 294.
See description under Division of Basic Studies.

293 Engineering Mathematics (also Mathematics 293) Fall or spring. 3 credits. Evening exams (see Mathematics 293). Prerequisite: Mathematics 192 or 194.
Infinite series, complex numbers, first and second order ordinary differential equations with applications in the physical and engineering sciences.

294 Engineering Mathematics (also Mathematics 294) Fall and spring. Fall: 3 credits; spring: 4 credits. Evening exams (see Mathematics 294). Prerequisite: Mathematics 293.
Vector spaces and linear algebra, matrices, eigenvalue problems and applications to systems of linear differential equations. Vector calculus. Boundary value problems and introduction to Fourier series.

Engineering Mathematics

310 Advanced Engineering Analysis I Fall. 3 credits. 3 lec. Prerequisite: Mathematics 294 or equivalent.
Ordinary differential equations as applied in engineering context. Analytical and numerical

methods. Special functions, initial value, boundary value and eigenvalue problems in linear partial differential equations, introduction to nonlinear ordinary differential equations.

311 Advanced Engineering Analysis II Spring. 3 credits. Prerequisite: T&AM 310 or equivalent. Functions of several variables, introduction to complex variables, analytic functions, conformal mapping, method of residues. Application to the solution of Laplace's equation, and transform inversion techniques. Examples drawn from fluid mechanics, heat transfer, electromagnetics, and elasticity.

610 Methods of Applied Mathematics I Fall. 3 credits. 3 lec. Intended for beginning graduate students in engineering and science who have a heterogeneous mathematical background. An intensive course, requiring more time than is normally available to undergraduates (see T&AM 310–311), but open to exceptional undergraduates with permission of instructor.
Emphasis is on applications. Linear algebra; calculus of several variables; vector analysis; series; ordinary differential equations; complex variables.

611 Methods of Applied Mathematics II Spring. 3 credits. 3 lec. Prerequisite: T&AM 610 or equivalent.
Emphasis on applications. Partial differential equations; tensor analysis; calculus of variations.

613 Methods of Applied Mathematics IIIa Fall. 2 credits. Prerequisite: T&AM 611 or equivalent. First of an 8-credit sequence (T&AM 613, 614, 615, 616) that develops advanced mathematical techniques for engineering problems.
Review of complex variable theory; conformal mapping; complex integral calculus. Nonlinear partial differential equations; general theory of characteristics.

614 Methods of Applied Mathematics IIIb Spring. 2 credits. Prerequisite: 613 or equivalent.
Integral transforms for partial differential equations. Green's function; asymptotics, including steepest descent and stationary phase, Wiener-Hopf technique. Problems drawn from vibrations and acoustics, fluid mechanics and elasticity, heat transfer, and electromagnetics.

615 Methods of Applied Mathematics IVa Fall. 2 credits. Prerequisite: T&AM 611 or equivalent.
In context of applications: regular and singular perturbation theory, method of matched asymptotic expansions, two timing (method of multiple scales), WKB approximation.

616 Methods of Applied Mathematics IVb Spring. 2 credits. Prerequisite: concurrent registration in T&AM 614 or equivalent.
In context of applications: Hilbert-Schmidt and Fredholm theories of integral equations, Wiener-Hopf equations with application to finite interval, Carleman equation and its generalization, effective approximations.

Experimental Mechanics

[640 Experimental Mechanics Fall. 3 credits. 1 lec. Not offered 1979–80.
Each student is expected to perform six to ten experiments in mechanics, selected to meet his or her individual interests. Topics: elastic, viscoelastic, microplastic, and plastic response of materials; linear and nonlinear vibration of discrete and continuous systems; acoustic and elastic wave propagation and scattering phenomena; dynamical stability of rigid bodies; analog and digital simulation of dynamical systems; magnetoelastic interactions.]

Continuum Mechanics and Inelasticity

[450 Introduction to Continuum Mechanics Fall. Offered alternate years. 3 credits. Not offered 1979–80.
Provides a foundation for further studies in fluid and solid mechanics, materials science, and other branches of engineering. Vector and tensor analysis; kinematics of deformation; analysis of stress and strains; balance laws of physics; constitutive equations; examples of elasticity and fluid mechanics.]

651 Continuum Mechanics and Thermodynamics Fall. 3 credits. Offered alternate years.
Kinematics; conservation laws; the entropy inequality; constitutive equations; frame indifference; material symmetry. Simple materials and the position of classical theories in the framework of modern continuum mechanics.

752 Topics in Continuum Mechanics Spring. 3 credits. Prerequisite: T&AM 651. Offered alternate years.
Theory of (nonlinear) elasticity and thermoelasticity; universal solutions, wave propagations, and stability theory. Nonlinear viscoelastic fluids and solids. Viscometric flows. Materials with continuum microstructure.

754 Analytical Methods in Continuum Mechanics Spring. 3 credits. Prerequisite: permission of instructor. Offered alternate years.
Tensor analysis with applications to shell theory, incompatibility, and finite elasticity. Calculus of variations. Group theoretical methods in solid and fluid mechanics. Noether's theorem. Conservation laws.

757 Viscoelasticity, Creep, and Fracture Fall. 3 credits. Offered alternate years.
Linear viscoelasticity: constitutive equations, models, differential and integral operators, Laplace transforms, complex modulus, vibrations and wave propagation, boundary value problems. Thermoviscoelasticity. Creep: classical and modern theories, stress redistribution, boundary value problems. Fracture: criteria, stress singularities.

[758 Theory of Plasticity Fall. Offered alternate years. 3 credits. Not offered 1979–80.
Plastic stress-strain laws, yield criteria, flow rules. Work hardening. Flexure and torsion of bars. Boundary-value problems — thick cylinders, spheres, discs, general 3-D. Residual stress. Limit analysis of structures. Plane strain — slip line theory.]

Elasticity and Waves

663 Applied Elasticity Fall. 3 credits. Two 1½-hour lec.
Thin curved bars. Plane stress and strain in cylinders; effects of pressure, rotation, and thermal stress. Small (and large) deflection theory of plates; classical, approximate, and strain-energy methods. Thin cylindrical shells. A first course in elastic deformable bodies with numerous engineering applications.

664 Theory of Elasticity Spring. 3 credits. Two 1½-hour lec.
Analysis of stress and strain. Airy's stress function solutions using Fourier series and integrals. Torsion theory. Three-dimensional solutions. Bending of prismatical bars. Axially loaded circular cylinder and half space. All topics are illustrated by engineering applications.

666 Fundamentals of Acoustics (also Electrical Engineering 690) Spring. 3 credits. 3 lec, biweekly lab.
Introduction to the principles and theories of acoustics. The vibrations of strings, bars, membranes, and plates; plane and spherical acoustic waves; transmission phenomena; resonators and filters; waves in solids and fluids. Application is made to sonic and ultrasonic transducers, music and noise, and architectural acoustics, and an introduction is given to the processing of acoustic signals. At the level of *Fundamentals of Acoustics* by Kinsler and Frey.

[667 Mechanical Vibrations and Waves Fall. 3 credits. Two 1½-hour lec, 4 labs each semester. Not offered 1979–80.
Review of vibrations of discrete systems, including multi-degree-of-freedom vibrations, forced oscillations, determination of natural modes and frequencies. Unified treatment of vibrations and wave phenomena in continuous elastic systems including strings, rods, beams, membranes, and plates. Approximate methods for finding natural modes and frequencies. Calculation of wave speeds, dispersion, and group velocity. Plane, cylindrical, and spherical waves. Transient response of discrete and continuous systems.]

765 Mathematical Theory of Elasticity Spring. Offered alternate years. 3 credits. Prerequisite: T&AM 664.
The basic equations of large-deformation elasticity; solution of certain large-deformation problems. Linearization. Boussinesq-Papkovich potentials and three-dimensional problems; plane stress by method of Muskhelishvili; conformal mapping; torsion problems.

768 Elastic Waves in Solids Fall. 3 credits. Two 1½-hour lec. Offered alternate years.
An advanced course on dynamic stress analysis and wave propagation in elastic solids. Theory of elastodynamics. Waves in isotropic and anisotropic media. Reflection and refraction. Surface waves and waves in layered media. Transient waves and methods of Lamb-Cagniard-Pekeris. Thick plate theories. Vibration of spheres. Scattering of waves and dynamic concentration.

Dynamics and Space Mechanics

670 Intermediate Dynamics Fall. 3 credits. Two 1¼-hour lec.
Newtonian mechanics for single particles and systems of particles, conservation laws, central-force motion; special relativity; Eulerian mechanics for rigid bodies, tops, gyroscopes; generalized coordinates, D'Alembert's principle, Lagrangian equations, analytic mechanics for particles and rigid bodies.

672 Celestial Mechanics (also Astronomy 579) Spring. 3 credits. Two 1¼-hour lec. Offered alternate years.
Description of orbits; 2-body, 3-body and n-body problems; Hill curves, libration points and their stability; capture problems; virial theorem. Osculating elements, perturbation equations: effects of gravitational potentials, atmospheric drag, and solar radiation forces on satellite orbits; secular perturbations, resonances.

673 Mechanics of the Solar System (also Astronomy 571) Spring. 3 credits. Two 1¼-hour lec. Prerequisite: an undergraduate course in dynamics.
Gravitational potentials, planetary gravity fields. Free and forced rotations, Chandler wobble, polar wander, damping of nutation. Equilibrium tidal theory, tidal heating. Orbital evolution of natural satellites, resonances, spin-orbit coupling, Cassini states. Long-term variations in planetary orbits. Dust dynamics. Dynamics of ring systems. Physics of interiors, seismic waves, free oscillations. Illustrative examples are drawn from contemporary research.

[771 Advanced Dynamics Fall. 3 credits. Prerequisite: T&AM 670 or equivalent. Offered alternate years. Not offered 1979–80.
Review of Lagrangian mechanics; Hamilton's principle, the principle of least action, and related

topics from the calculus of variations; Hamilton's canonical equations; approximate methods for two-degrees-of-freedom systems (Birkhoff's transformation); canonical transformations and Hamilton-Jacobi theory; Poisson stability and related topics from topological dynamics; Hamilton's principle for continuous systems, applications to shell dynamics.]

775 Nonlinear Vibrations Fall. 3 credits. Prerequisite: T&AM 667 or equivalent. Offered alternate years.
Review of linear systems, free and forced vibrations. Nonlinear systems, phase plane methods, method of isoclines. Conservative systems. General autonomous systems, equilibrium and periodic solutions, linearization and Lyapunov stability criteria, Poincare-Bendixson theorem, indices. Quantitative analysis of weakly nonlinear systems in free and forced vibrations, perturbation methods, Krylov-Bogoliubov method. Applications to problems in mechanics.

776 Stability of Motion Spring. 3 credits. 3 lec. Offered alternate years.
Definitions of Lagrange, Lyapunov, and orbital stability; invariance of these definitions under a change of coordinates; linearized variational equations: Jordan canonical form, Floquet theory, perturbations, Mathieu's equation, Lyapunov's theory of types; nonlinear variational equations: Lyapunov's direct method, validity of the linearized variational equations.

[777 Qualitative Theory of Dynamical Systems Fall. 3 credits. Prerequisite: T&AM 775 or equivalent. Offered alternate years. Not offered 1979–80.
Review of planar (single degree-of-freedom) systems. The concept of dynamical systems, local and global analysis. N-dimensional systems, types of solutions, Poincare maps, stability. Structural stability and generic properties, bifurcations in planar systems. Discrete dynamical systems, maps and difference equations, homoclinic and heteroclinic motions, the Smale Horseshoe and other complex invariant sets. Implications for systems of dimension greater than 3, strange attractors and chaos in free and forced oscillator equations.]

Special Courses, Projects, and Thesis Research

491–492 Project in Engineering Science 491, fall; 492, spring. 1 to 4 credits, as arranged.
Projects for undergraduates under the guidance of a faculty member.

591–592 Project in Mechanics 591, fall; 592, spring. 1 to 4 credits, as arranged.
A minimum of 3 credits must be completed by each candidate for the M.Eng. (Engineering Mechanics) degree.

798–799 Selected Topics in Theoretical and Applied Mechanics 798, fall; 799, spring. 1 to 4 credits, as arranged.
Special lectures or seminars on subjects of current interest. Topics are announced when the course is offered.

890–990 Research in Theoretical and Applied Mechanics Fall or spring. 1 to 6 credits (890), 1 to 9 credits (990), as arranged.
Thesis or independent research at the M.S. (890) or Ph.D. (990) level on a subject of theoretical and applied mechanics. Research is under the guidance of a faculty member.

School of Hotel Administration

For more complete information about undergraduate program requirements, see the *Announcement of the School of Hotel Administration* or the *Announcement of Academic Information.*

The school offers programs leading to the degrees of Master of Professional Studies, Master of Science, and Doctor of Philosophy. For further information on graduate degree programs, the reader should consult the *Announcement of the Graduate School* or contact Professor Stanley W. Davis, the director of the M.P.S. program.

For the most current and detailed information regarding course offerings of the School of Hotel Administration, the student should consult the supplementary course announcement issued each semester through the school's records office.

Administrative and General Management

101 Orientation Fall or spring. 1 credit. S-U grades only. Required.
M 2:30–3:20. M. A. Noden.
An introduction to the school, Statler Inn, and the various facets of the hospitality industry.

102 Lectures in Hotel Management Fall. 1 credit. Hotel elective.
F 1:25. R. A. Beck.
A series of lectures given by nonresident speakers prominent in the hotel, restaurant, and allied fields.

200 Personal Real Estate Investments Fall or spring. 2 credits. Limited to juniors and seniors from outside the School of Hotel Administration.
M 10:10–12:05. D. Sher.
Lectures and case studies cover the advantages and disadvantages of real estate investments and how to maximize gain and minimize risk and possible loss. Subjects covered include (1) the economics of real estate, tax shelters, financial leverage; (2) types of personal real estate investments; (3) risk analysis, cash flow, and return on investment; (4) sources of financing; (5) joint ventures and syndications; and (6) acquisition and development of real estate.

203 Club Management Fall or spring. 2 credits. Hotel elective.
M 10:10–12:05. J. F. Tewey and guest lecturers.
The private membership club, and how it differs from other business forms in the hospitality industry. Emphasis is on legal and operational aspects of ownership and governance. All types are discussed, from the small in-town luncheon club to the large, complex suburban operation. New developments in the field are surveyed. Several club managers serve as guest lecturers.

204 Franchising in the Hospitality Industry Fall. 2 credits. Hotel elective.
M 4:30–6:25. D. E. Whitehead.
Relationships between franchisor and franchisee, advantages and disadvantages of franchising, structure and services offered by franchisors. Case studies of leading motor inn and restaurant companies currently offering franchises.

205 Resort and Condominium Management Spring. 3 credits. Hotel elective
Lec, T 1:25, R 2:30–4:25. M. A. Noden
The operation of resort hotels and condominiums. Resorts of the various types, seasons, and economic levels are considered. Emphasis is on the promotion of business, the provision of facilities and services and guest entertainment, and the selection, training, and direction of the employed staff. Terminology, rental pool agreements, and S.E.C. regulations, together with developer-management-owner contracts and relationships in condominiums, are reviewed.

206 General Insurance Fall. 3 credits. Hotel elective.
M 2:30–4:25. K. McNeill.
A comprehensive introduction to the insurance field. The emphasis is on fire insurance, casualty insurance, and multiple peril policies. Topics covered may include: the law of contracts as it relates to insurance; the fire insurance policy and fire insurance forms; business interruption, marine, burglary, crime, and liability insurance; rates and rate making; bonds; negligence and torts; compensation; package policies; adjustment of losses; and types of insurers.

[301 Development of a Hospitality Property Fall. 3 credits. Hotel elective. Not offered 1979–80.
M 2:30–4:25. D. E. Whitehead.
Students work in seminar groups of 2 to 4 to develop a hospitality project. All aspects of development are covered from the feasibility study, site acquisition, franchising, construction management, operational preopening, marketing, personnel training, furniture and fixture installation through the opening of the hotel, motor inn, or restaurant.]

302 Principles of Management Fall or spring. 3 credits. Prerequisite: Hotel Administration 211 or equivalent. Hotel elective. Students planning to enroll eventually in Hotel Administration 401 are urged to take this course, as it will be a prerequisite for 401 at a future date.
W 11:15–1:10, F 9:05. P. L. Gaurnier.
A basic course designed to examine management processes, concepts, and principles, and to improve personal competence in decision making, problem solving, and communication. Required readings highlight both classical and modern concepts of management.

304 Rooms Division Management — Front Office and Reservations Fall. 2 credits. Hotel elective. Estimated cost of field trip, $50.
F 2:30–4:25. D. A. Dermody and S. Weisz.
An operational view of the front office and reservation functions. A trip to Washington, D.C., is scheduled for late in the term. The course, under the direction of Professor Dermody, is taught by personnel of Marriott Hotels.

305 Rooms Division Management — Housekeeping and Laundry Operations Spring. 2 credits. Hotel elective.
Hours to be arranged. D. A. Dermody and guest lecturers.
The operation of the housekeeping and laundry departments.

306 General Survey of Real Estate Fall or spring. 2 credits. Prerequisite: Hotel Administration 281 and 282 or equivalent, or written permission. Hotel elective
M 2:30–4:25. D. Sher.
A practical survey of real estate as the capital investment decision in the hospitality industry and related retail industries. Lectures and case studies cover the role and importance of real estate in the retail environment; the relationship of real estate to the marketing strategy of a company and its investment decisions; the marketing and merchandising of real estate; the financing of real estate; and the effects of real estate financing on a company's overall corporate financial structure and on its future borrowing ability.

307 Hotel Security and Crime Prevention Summer (June 4–15, 1979). 2 credits. Hotel elective.
M–F 9–4. J. E. H. Sherry and school faculty.
Designed to provide corporate hotel management with a practical orientation for resolving the operational losses related to personal and physical premises security. Faculty members discuss aspects of legal liability, insurance protection, architectural and interior design controls, financial controls, and personnel administration.

401 Seminar in Management Principles Fall or spring. 2 credits. Prerequisites: Hotel Administration 211 or equivalent. Limited to 20 seniors and graduate students. Hotel elective.
T 11:15–1:10. P. L. Gaurnier.
This course uses the case-study approach to management principles and concepts. Each student prepares a comprehensive analytical report, based on previous work, for class discussion and analysis.

402 Hotel Management Seminar Fall. 1 credit. Limited to 20 seniors and graduate students. Hotel elective.
F 10:10. R. A. Beck.
A meeting with the Hotel Administration 115 speaker for the week. The subject matter varies, depending on the visitor and his or her area of expertise. Students are expected to ask questions and participate in discussions.

403 The Small Business Fall or spring. 3 credits. Limited to 24 seniors and graduate students who have received written permission of the instructor. Hotel elective.
W 10:10–12:05, R 11:15. R. M. Cantwell and guest lecturers.
Managerial problems as related to small business operations. Emphasis is on the acquisition of a new business or the takeover of an existing business. Preliminary investigation prior to decision making is explored. Case studies are used to illustrate relevant points. A term project is required.

404 Management Organization of Small Business Fall or spring. 3 credits. Prerequisite: Hotel Administration 221 or Agricultural Economics 323 or equivalent. Limited to hotel school seniors and graduate students; open to out-of-school students with written permission only. Hotel elective. Approximate cost of field trips, $50.
T 9:05–11, R 9:05. R. M. Cantwell and guest lecturers.
A comprehensive survey of basic management fundamentals to plan, organize, direct, and control the small enterprise. Course work includes a team term project, selected readings, case studies, and field exercises.

406 Integrated Case Studies in the Hospitality Industry Fall or spring. 3 credits. Limited to 36 seniors. Hotel elective.
W 1:25–4:25. R. M. Cantwell and P. L. Gaurnier.
Analysis of case studies involving issues of business strategy, human relations, administration, marketing, and finance. Students apply course principles in a restaurant management simulation exercise.

407 Seminar in Hotel Operations Spring. 2 credits. Limited to 30 seniors and graduate students. Hotel elective. Estimated cost of field trip, $30.
F 10:10–12:05. P. L. Gaurnier.
Intended to provide a working knowledge of terminology, concepts, and procedures utilized by hotel management in developing information and making decisions relevant to forecasting and controlling manpower requirements consistent with fluctuating business conditions. Major topics include: staff planning, budgeting, scheduling and payroll control, forecasting technique and practice, considerations for operating within the guidelines of collective bargaining, financial statement analysis, and hotel case studies oriented toward productivity analysis. A field trip, usually in the third week, is required.

408 Casino Management Fall or spring. 2 credits. Limited to 60 seniors and graduate students. Hotel elective. Estimated cost of field trip, $50.

M 2:30–4:25. D. E. Whitehead and guest lecturers.
The management responsibility of casino operations. General instruction in the basic casino games including odds, percentages, and strategy. Overview and analysis of casino administration with emphasis on the relationships and responsibilities between hotel general manager and casino manager, marketing and junkets, physical layouts, licensing, governmental regulation, staffing, internal controls, and security systems. Includes a weekend field trip to Atlantic City.

409 T.A. Training in Administrative and General Management Fall or spring. 1–3 credits. Prerequisite: written permission of instructor. Hotel elective.
Hours to be arranged. Faculty.
The student planning to be a teaching assistant in administrative and general management is exposed to recommended techniques of instruction and such other methodology, readings, etc., as the professor in charge of the course may require.

701 Graduate Seminar in Hotel Operations Fall. 2 credits. Limited to 30 last-term seniors and graduate students. Hotel elective. Estimated cost of field, $75.
F 10:10–12:05. P. L. Gaurnier.
Intended to provide a working knowledge of terminology, concepts, and procedures utilized by hotel management in developing information and making decisions relevant to forecasting and controlling manpower requirements consistent with fluctuating business conditions. Major topics include: staff planning, budgeting, scheduling and payroll control, forecasting technique and practice, considerations for operating within the guidelines of collective bargaining, financial statement analysis, and hotel case studies oriented toward financial statement analysis and toward productivity analysis. A field trip to the participating hotel is required.

Human Resources Management

111 Introductory Psychology Fall or spring. 3 credits. Required.
M W F 9:05. Human resources faculty.
An introductory study of basic psychological principles involved in understanding human behavior, essential for successful hotel management and further applied study. Basic concepts of sensation, perception, learning, motivation, and development are discussed.

211 Management of Human Resources Fall or spring. 3 credits. Prerequisite for hotel students: Hotel Administration 111. Required.
Lec, M W 11:15, 12:20, 1:25, or 2:30; 1-hour lab to be arranged. D. A. Dermody and R. C. Quick.
Problems of personnel management, including an introduction to the personnel function; recruitment, selection, and placement of personnel; the role of supervision with emphasis on induction, training, communications, performance appraisal, and leadership style; wage and salary administration; motivation; and union-management relations. Emphasis is on class discussion and analysis of case problems from business and industry.

311 Union-Management Relations in Private Industry: A Survey Spring. 3 credits. Limited to juniors, seniors, graduate students, and those who have received written permission of the instructor. Hotel elective.
W 1:25, R 4:30–6:25. F. A. Herman.
Major areas of study include: the development of the trade union movement in the United States, with emphasis on the history and structure of unions active in all phases of the hospitality industry; federal and state laws governing the bargaining relationship, including the role of the National Labor Relations Board; the collective bargaining process, including negotiations and contract administration; and the critical role of conciliation procedures (such as mediation and arbitration) in keeping industrial peace.

314 Psychology in Business and Industry Fall or spring. 3 credits. Prerequisites: Hotel Administration 111 and 211 or equivalent. Limited to 35 students. Hotel elective. Students who plan to take Hotel Administration 315 should plan to take 314, first.
T R 12:20–1:35. Faculty.
The principles of psychology applied to industrial and business systems; personnel selection; placement and training; problems at work including evaluation, motivation, efficiency, and fatigue; and the social psychology of the work organization.

416 Special Studies in the Management of Human Resources Fall. 3 credits. Prerequisite: Hotel Administration 211. Limited to seniors and graduate students, except for those who have received written permission of the instructor. Hotel elective.
M 7:30–9:30 p.m., T 1:25–2:15. D. A. Dermody and guest lecturers.
A case-study approach to the problems and challenges of managing people in business organizations. Actual cases are presented for discussion by individuals who were themselves involved in the case.

419 T.A. Training in Human Resources Management Fall or spring. 1–3 credits. Prerequisite: written permission of instructor. Hotel elective.
Hours to be arranged. Faculty.
The student planning to be a teaching assistant in human resources management is exposed to recommended techniques of instruction and such other methodology, readings, etc., as the professor in charge of the course may require.

711 Dispute Resolution in Service Industries Fall. 3 credits. Limited to graduate students and seniors who have received written permission. Hotel elective.
W 2:30–5:30. F. A. Herman.
The nature of conflicts that arise during negotiation of new labor contracts (interest disputes), and those that arise over the meaning and interpretation of labor contracts already in force (grievance disputes). Methods for resolving conflicts in nonunionized properties are also explored. Picketing, recognition, certification and decertification, unfair labor practices, successor rights and obligations, and pre-election behavior are discussed and illustrated, as are the practical applications of grievance handling through the final step of the procedure (usually arbitration).

Accounting and Financial Management

120 Basic Principles of Accounting and Financial Management Fall or spring. 2 credits. Limited to students outside the School of Hotel Administration. Intended for students who desire a general knowledge of the language of business and finance.
M 2:30–4:25. Faculty.
A survey of accounting principles, financial statements, cash forecasting, cash budgeting, and an introduction to financial analysis.

121 Financial Accounting Fall. 3 credits. Required. Limited to School of Hotel Administration students.
Lec, M W 10:10; 1-hour lab to be arranged. J. J. Eyster.
An introduction to the basic principles of accounting, involving transactions analysis, flow of accounting data to the financial statements, and careful consideration of accounting for revenues, expenses, assets, liabilities, and owner's equity.

122 Hospitality Accounting Systems Fall or spring. 3 credits. Prerequisite: Hotel Administration 121 or equivalent.
Lec, T R 9:05; 2-hour lab to be arranged. D. C. Dunn.
The accounting systems recommended by the American Hotel and Motel Association, the National Restaurant Association, and the Club Managers' Association of America for hotels, motels, restaurants, and clubs. Topics include hotel and motel front office accounting; accounting for the restaurant and other sales areas; special journals and ledger accounts peculiar to hospitality accounting systems; the flow of accounting transactions through the accounting system; and the preparation and interpretation of financial statements.

125 Finance Spring. 3 credits. Prerequisite: Hotel Administration 121 or equivalent. Required.
Lec, T R 9:05 or 11:15. D. H. Ferguson.
An objective study of financial management in profit-oriented enterprises. Important concepts include cash flow, the time value of money, and capital budgeting. Emphasis is on the analysis of accounting information, problem solving, and decision making.

220 Financial Accounting Principles Fall or spring. 3 credits. Limited to students outside the School of Hotel Administration in the fall; in the spring, hotel students may substitute this course for 121.
Lec, M W 10:10; 1-hour lab to be arranged. Faculty.
The basic principles of accounting, including transactions analysis, and flow of accounting data to the financial statements. Emphasis is on accounting for revenues, expenses, assets, liabilities, and owner's equity.

221 Managerial Accounting Fall. 3 credits. Prerequisites: Hotel Administration 121 and 125 or equivalent.
Lec, T R 10:10; 2-hour lab to be arranged. Two evening exams to be arranged. D. H. Ferguson.
The use of accounting information for managerial planning, control, and evaluation. Particular emphasis is on differential accounting and its role in extracting relevant decision variables. Other topics are accounting systems, behavior of costs, budget preparation, standard costs, the analysis of variance from standard costs, and performance reports.

222 Managerial Accounting in the Hospitality Industry Spring. 3 credits. Prerequisite: Hotel Administration 122 or 221 or equivalent. Limited to 160 students. Required.
Lec, M W 10:10; 1-hour lab to be arranged. J. J. Eyster.
Methods of operational analyses for hospitality properties are evaluated and used in ratio, comparative, and cost-volume-profit analyses. Other topics include internal control, operational budgeting, and the use of feasibility studies in long-term capital budgeting decisions. Stress is on presenting analysis results in management letters.

223 Front Office Machine Accounting Fall or spring. 1 credit. Prerequisite: Hotel Administration 121 or equivalent. Hotel elective.
Two-hour practice to be arranged. D. C. Dunn.
Students learn the operation of the NCR front office posting machine by completing a series of practical exercises ranging from simple posting of charges and credits to error correction and the night audit.

224 Food and Beverage Control Fall or spring. 2 credits. Prerequisites: Hotel Administration 122 and 132, or written permission of instructor. Hotel elective.
R 10:10–12:05. J. F. Tewey.
Essentials of food and beverage control from both the operational and accounting standpoints. Practice with typical methods and forms found in the hospitality industry.

321 Hotel Management Contracts Fall (weeks 2–8 only). 1 credit. Limited to 60 juniors, seniors, and second-year graduate students. Hotel elective.
M 12:20–2:15. J. J. Eyster and guest lecturers.
A critical analysis of the negotiation and administration of hotel management contracts. Topics include: advantages, disadvantages, and risks of contracts to both owners and operators; owner and operator concerns during negotiations and their resolution; owner and operator concerns during administration of the contract; and the future role of contract use. Guest lecturers include owners and operators.

322 Investment Management Fall or spring. 2 credits. Limited to juniors, seniors, and graduate students. Hotel elective.
T 2:30–4:25. Faculty.
A survey of investment opportunities and the methods of analysis used by business and the individual to determine the best use of investment funds. Special emphasis is placed on the stock and bond markets, including security portfolio management.

323 Financial Analysis and Planning Fall. 3 credits. Prerequisite: Hotel Administration 222. Hotel elective.
T R 9:05–11. J. J. Eyster.
After defining and describing the environment in which a business organization must design its strategy, an examination will be made of financial analysis and planning techniques necessary to operate in that environment. Focus is on discussion and case studies involving the following areas of financial management: the tax environment, profit planning and forecasting, budgeting, capital budgeting techniques, and cost of capital determination.

324 Financial Charts and Graphs Spring (weeks 2–8 only). 1 credit. Prerequisite: Hotel Administration 251 and 221. Limited to 20 students. Hotel elective.
W 2:30–4:25. R. H. Penner.
An introduction to and concentrated study of financial charting—the visual presentation of quantitative data. Includes a review of the several types of charts and graphs and their use to show relative or proportionate amount, trend, etc. Students analyze and evaluate charts in annual reports and the media, and design charts to communicate data effectively.

326 Introduction to Statistical Analysis and Inference Fall. 3 credits. Limited to juniors, seniors, and graduate students. Students with *any* previous exposure to statistics or probability should see the instructor before enrollment. Hotel elective.
T R 11:15–1:10. D. C. Dunn.
An introduction to the basic techniques of statistical method.

421 Internal Control in Hotels Spring. 2 credits. Prerequisite: Hotel Administration 122 or equivalent. Limited to seniors and other students who have received permission of instructor. Hotel elective.
T R 9:05 or 10:10. A. N. Geller.
Discussion of problems encountered in distributing the accounting and clerical work in hotels to ensure a good system of internal control. Study of many actual cases of the failure of internal control and the analysis of the causes of the failure. Practical problems and actual techniques of functioning systems of internal control.

422 Personal and Corporate Taxation Fall. 2 credits. Limited to 50 juniors, seniors, and graduate students. Hotel elective.
M 10:10–12:05. R. Gilfoil.
An overview and history of tax legislation initiates the course and documents the impact of taxation upon business and personal financial management. Specific topics include personal income tax, federal and state corporate tax, tax incentives, and tax shelters.

429 T.A. Training in Accounting and Financial Management Fall or spring. 1–3 credits. Prerequisite: written permission of instructor. Hotel elective.
Hours to be arranged. Faculty.
The student planning to be a teaching assistant in accounting and financial management is exposed to recommended techniques of instruction and such other methodology, readings, etc., as the professor in charge of the course may require.

722 Graduate Managerial Accounting in the Hospitality Industry Spring. 3 credits. Required M.P.S. course.
T 2:30–4:25, R 11:15–1:10. J. J. Eyster.
Hotel and restaurant accounting systems that provide decision-making information to management are reviewed. Methods of operational analysis for hospitality properties are evaluated and utilized to include ratio, comparative, and cost-volume-profit analyses. Other topics include internal control, operational budgeting and the use of feasibility studies in long-term capital budgeting decisions. Stress is on communicating analysis results using management letters.

723 Graduate Corporate Finance Fall. 4 credits. Prerequisite: Hotel Administration 722. Recommended: knowledge of algebraic techniques and elementary statistics (students who have not recently had a statistics course are urged to purchase and study programmed review books in mathematics and elementary statistics). A list of recommended books (available at the Campus Store) will be distributed at registration. Required M.P.S. course.
Lec, T R 2:30–4:25; 2-hour section to be arranged. A. N. Geller.
An introduction to the principles and practices of business finance, including the development of theory and its application in case studies. Specific topics include types of securities and their uses, valuation concepts, capital budgeting, cost of capital, capital structure, dividend policy, long-term financing and bank relations, short and intermediate term financial management, mergers and consolidations, and the legal aspects of financial management.

724 Interpretation and Analysis of Financial Statements Spring. 3 credits. Prerequisite: all required hotel accounting courses. Limited to 20 students. Required M.P.S. course.
Seminar, T R 2:30–4:25. A. N. Geller.
The various financial accounting issues encountered in reporting the results of operations of corporate enterprises are discussed. A macro view of the firm will be taken with emphasis on both outsiders' views of the operation, and decision making, through interpretation of the published statements. Current generally accepted accounting principles and future extensions are explored and discussed. Emphasis is on the components of financial statements, how and why they are reported, and their impact on the overall financial position of the firm.

Food and Beverage Management

A new required course sequence in food management becomes effective fall 1979. The numbers of courses in the new sequence are followed by an "N" below for the convenience of the reader. Students who matriculated before that semester follow the old sequence (courses appearing in brackets [] below). Students should refer questions about course requirements in this department to the school's registrar.

131N Introduction to Food and Beverage Management Fall or spring (first offered fall 1979). 2 credits. Required.
W 11:15–1:10. Food and beverage management faculty.
An introductory course to familiarize students with the language and systems of commercial food and beverage operations, including food production, equipment, utilities, preparation, cooking, beverage, and service will compose a major portion of the course.

132N Food Production Techniques Fall or spring (first offered spring 1980). 1 credit. Required. Prerequisite: Hotel Administration 131N.
Hours to be arranged. Food and beverage management faculty.
Laboratory work in food and beverage preparation and service.

[132 Commercial Food Service Production Fall or spring; *not offered after fall 1979.* 3 credits. Required.
Lec, M 12:20; 7½-hour lab to be arranged. Food and beverage management faculty.
Working alternate weeks students prepare and serve the dinner meal in the Statler Inn Rathskeller for half of the term and spend the other half of the term in the laboratory.]

231 Meat Science and Management Fall or spring. 3 credits. Required. Estimated cost of field trip, $60.
Lec, M 2:30–4:25; 2-hour lab to be arranged. S. A. Mutkoski.
Deals with the major phases of meat, poultry, and fish service from the hotel, restaurant, club and institutional standpoints; nutritive value, structure and composition; sanitation; selection and purchasing; cutting, freezing, portion control, and specifications; cooking, carving, and miscellaneous topics. A three-day field trip to visit purveyors in New York is required.

232N Institutional Food Production Systems Fall or spring (first offered fall 1980). 3 credits. Required. Prerequisites: Hotel Administration 171, 172, 173, 231, 131N, and 132N.
Hours to be arranged. Food and beverage management faculty.
Application of principles of menu planning; purchasing; receiving; storage; issuing; sanitation; preparation; scheduling; human relations.

[232 Operational Food Production Systems Fall or spring; *not offered after fall 1980.* 3 credits. Required. Estimated cost of utensils, $30.
M 1:25; 6-hour lab to be arranged. J. F. Dürocher.
Students in the afternoon laboratory plan, prepare, and manage the dinner meal for the Statler Inn main dining room for half of the term and for Café Rhea for the other half of the term. In addition, students have the responsibility for Statler Inn banquets. Students in the morning laboratory plan and manage the preparation and service of the luncheon meal in Café Rhea for half of the term and in the main dining room for the other half.]

331N Food Production Management Systems—Restaurant and Banquet Fall or spring (first offered spring 1981). 3 credits. Required. Prerequisite: Hotel Administration 232N.
Hours to be arranged. Food and beverage management faculty.
Preparation techniques and service of à la carte menus, with emphasis on beginning management skills.

332N Restaurant Management Fall or spring (first offered fall 1981). 3 credits. Elective. Prerequisite: Hotel Administration 232N.
Hours to be arranged. Food and beverage management faculty.
Policies and procedures of the food and beverage system, food and beverage control, and human relations practices.

333 Corporate Restaurant Management Fall. 3 credits. Prerequisite: Hotel Administration 232. Limited to 35 upperclass and graduate students. Hotel elective. Estimated cost of field trip, $50.
T 10:10, R 9:05–11. V. A. Christian.
Principles of modern restaurant management as they relate to small and large corporate organizations. Case studies and lectures cover such topics as: managerial and technical duties, governmental regulations, and guest demands. A field trip to Washington is conducted. This course is recommended only for those with intensive interest in food and beverage management.

337 Survey of Beverages Fall or spring. 2 credits. Limited to juniors, seniors, and graduate students in the School of Hotel Administration. Hotel elective. Fee for tasting equipment, $5.
W 7:30–9:25. V. A. Christian.
An introduction to wines, beers, spirits, and other beverages as they relate to the hospitality industry. Samples from a variety of countries, regions, and vineyards are evaluated.

338 Purchasing Spring. 2 credits. Limited to 65 juniors, seniors, and graduate students in the School of Hotel Administration. Hotel elective.
R 2:30–4:25. S. A. Mutkoski.
An in-depth look into the functions of a purchasing department within a hotel or restaurant facility. The managerial aspects of purchasing, such as setting up a purchasing department, the function of the purchasing agent, purchasing specifications, purchasing forms, and controls are considered. Includes many of the products purchased by a food facility: china, flatware, glasses, fabric, meat, frozen foods, canned goods, produce, dairy products, etc. The products will be displayed by leading purveyors and discussed in detail.

430 Introduction to Wine and Spirits Fall or spring. 2 credits. Limited to seniors and graduate students outside the School of Hotel Administration. S-U grades only.
W 2:30–4:25. V. A. Christian.
The course begins with the history of wine and spirits. The main focus is on flavor characteristics, fermentation processes, and brand specifications. Lectures are also given on purchasing, storage, wine tasting techniques, and drink formulas. Samples from a variety of countries, regions, and vineyards are evaluated. Pre-enrolled students who do not attend the first class, and fail to notify the secretary in Statler 212 of their absence, will automatically be dropped from the course.

439 T.A. Training in Food and Beverage Management Fall or spring. 1–3 credits. Prerequisite: written permission of instructor. Hotel elective.
Hours to be arranged. Faculty.
The student planning to be a teaching assistant in food and beverage management is exposed to recommended techniques of instruction and such other methodology, reading, etc., as the professor in charge of the course may require.

731 Food and Beverage Management Fall or spring. 3 credits. Required M.P.S. course. Estimated cost of field trip, $60.
Lec, T 12:20, R 11:15–1:10; four 2-hour sessions to be arranged. V. A. Christian.
The managerial and operational principles and techniques of planning, operating, and evaluating a food and beverage operation. Special emphasis is placed on menu planning, wine list design, professional standards, and the managerial approach to purchasing, receiving, storage, issuing, preparation and service. A field trip is required.

732 Graduate Operational Food Production Systems Prerequisite: Hotel Administration 731 or equivalent. Limited to 27 students. Required M.P.S. course. Estimated expense for clothing and utensils, $95.
Lec, W 2:30–5:30; lab, F 2:15–10:20. A. L. Colucci.
Students are responsible for production and service of dinner for the Statler Inn main dining room, Café Rhea, and banquets. The course is designed to teach and apply the fundamentals of food production systems, from menu planning through service, and provide experience in managing a commercial kitchen or dining room. The lecture-demonstration provides further exposure to managerial as well as technical skills.

[733 Corporate Food and Beverage Management—Hyatt Fall. 3 credits. Prerequisites: Hotel Administration 731, 732, and written permission of instructor. Hotel elective. Estimated cost of field trip, $125. Not offered 1979–80.
Seminar, R 7–9:30 p.m. V. A. Christian and guest lecturers.
The operation of the food and beverage department of a 1000-room commercial hotel, examining the management and day-to-day operations and support systems. Lectures will be given by managers, directors, and department heads relating their experiences, problems, and successes. A working field trip of four days in Chicago is conducted. Each student will spend two shifts in a department of his or her choice, working with a key staff member or department head.]

735 Meat Science and Management Fall. 3 credits. Limited to graduate students. M.P.S. elective.
M 5–8 p.m. S. A. Mutkoski.
Purchasing, receiving, storage, utilization, and cost analysis of meat, fish, and poultry, as well as meat extenders and analogs, are discussed from the standpoint of commercial food service. This will be done in a seminar-lab combination. Independent research on current problems in meat science and management is required.

Law

341 Law of Business I Fall. 3 credits. Open to juniors and seniors, and a limited number of sophomores. Required.
M W F 10:10. J. E. H. Sherry.
A basic introduction to law and legal relationships in business. A variety of subjects are covered, all intended to aid managers in decision making.

342 Law of Business II Spring. 3 credits. Prerequisite: Hotel Administration 341. Hotel elective.
M W F 10:10. J. E. H. Sherry.
A continuation of 341 for those students who desire more extensive legal training to further their business careers. Emphasis is on the laws pertaining to the Uniform Commercial Code (sales and negotiable instruments); bailments; trusts and estates; transfers by will; unfair competition and trade regulation; bankruptcy and insurance.

344 Law of Innkeeping Fall or spring. 3 credits. Prerequisite or corequisite: Hotel Administration 341 or equivalent.
M W F 9:05. J. E. H. Sherry.
A basic grounding in the fundamentals of hotel and restaurant management as they affect legal rights and responsibilities. Emphasis is on recognition of issues and organization of solutions in a logical, well-conceived manner.

449 T.A. Training in Law Fall or spring. 1–3 credits. Prerequisite: written permission of instructor. Hotel elective.
Hours to be arranged. Faculty.
The student planning to be a teaching assistant in law is exposed to recommended techniques of instruction and such other methodology, reading, etc., as the professor in charge of the course may require.

744 Law of Innkeeping for Graduate Students Fall or spring. 3 credits. Required M.P.S. course.
M W F 8. J. E. H. Sherry.
A review of fundamentals followed by an in-depth consideration of the legal aspects of the hospitality industry.

Properties Management

251 Property Management Graphics Fall or spring. 3 credits. Required.
Lec, M W 9:05; 2-hour lab to be arranged.
J. M. Loughran.
An introduction to both properties management and hospitality facilities. Components of the course include projection and architectural drawing, site analysis and planning, and hotel functional design. Lab emphasis is on basic graphic skills, including the layout of lodging and dining spaces, and the interpretation construction drawings.

Note: Because of the academic calendar, the fall semester includes five weekly assignments, the spring semester six assignments.

351 Hotel Mechanical and Electrical Problems I Fall. 3 credits. Required. Prerequisite: Hotel Administration 251.
Lec, M W F 11:15; 2-hour lab to be arranged.
J. J. Clark.
Investigation of management problems associated with the mechanical systems of the physical plant. Utility management and energy conservation are emphasized. Water, electricity, and lighting systems as well as sound and acoustics are covered. Basic engineering theory of each system is taught. Capital, operating, and repair and maintenance costs are stressed.

352 Hotel Mechanical and Electrical Problems II Spring. 3 credits. Prerequisite: Hotel Administration 351. Required. Approximate cost of AIA articles and binders, 75¢.
Lec, M W F 11:15; 2-hour lab to be arranged.
M. H. Redlin.
Investigation of management problems associated with the mechanical systems of the physical plant with emphasis on major systems of heating, refrigeration, and air conditioning. The problems of capital expenditures, operating costs, and repairs and maintenance are stressed.

353 Introductory Food Facilities Engineering Fall. 3 credits. Limited to 20 students. Hotel elective.
Lec, M W 1:25; 2-hour lab to be arranged.
R. A. Compton, M. H. Redlin.
The basic concepts of food facilities design and planning. Studies are carried out to determine space allocation for kitchens, refrigeration, storage, waste disposal, and service areas. Development of basic production work flow in the preparation and service areas will be emphasized. The basic requirements for the selection of equipment utilizing industry

standards for production capability, quality of construction, and ease of maintenance are covered. Labs involve planning, design, and specification writing for a small- to medium-size restaurant kitchen.

354 Food Facilities Equipment Layout and Design Spring. 3 credits. Prerequisite: Hotel Administration 353. Limited to 15 students. Estimated cost of field trip, $150.
Lec, M W 1:25; 2-hour lab to be arranged.
M. H. Redlin.
Advanced applications of the basic concepts of food facilities design. Emphasis is on preparing a program, developing and evaluating equipment layouts, mechanical and electrical spotting, and equipment detail drawings. Focus is on large production kitchens. Includes an optional field trip.

451 Physical Plant Planning and Construction Fall or spring. 3 credits. Prerequisite: Hotel Administration 352. Required.
Lec, M W F 12:20–1:10; 2-hour lab to be arranged.
R. A. Compton.
The construction, renovation, and maintenance of hotels and food service operations are discussed and analyzed. Procedures, methods, and materials used in new construction projects are covered as well as repair, rehabilitation, and renovation of existing structures. Building codes, trade practices, materials, cost estimation, and management responsibilities are emphasized.

453 Seminar in Environmental Control Fall. 3 credits. Prerequisite: Hotel Administration 351, 352 and written permission of instructor. Limited to 10 students. Hotel elective.
Hours to be arranged. J. J. Clark.
Application of topics covered in Hotel Administration 351–352 to realistic projects. Projects for a given term are decided at an early seminar and emphasize utility management and control, internal environmental control (light, HVAC, acoustics), and ecological considerations.

454 Seminar in Hotel Planning Fall. 3 credits. Prerequisite: Hotel Administration 351 and written permission. Limited to 12 students. Hotel elective.
M W F 9:05. R. A. Compton.
The hotel planning process, emphasizing program development, site selection, conceptual design, and building systems. Discussion of space allocation, hotel equipment and furnishings, establishing budgets, and responsibilities of the development team. One or two team projects are developed.

455 Seminar in Restaurant Planning Spring. 3 credits. Prerequisite: Hotel Administration 351. Limited to 12 students. Hotel elective. Estimated cost of field trip, $150.
M W F 9:05. R. A. Compton.
The procedures followed in the planning of a restaurant facility. Primary emphasis is on design, engineering, and construction. Discussions of space allocation, trade practices, building and health codes, equipment and furnishings, cost estimations, and management responsibilities when working with professional planners. Case studies are used and a project will be developed. Includes an optional field trip.

459 T.A. Training in Properties Management Fall or spring. 1–3 credits. Prerequisite: written permission of instructor. Hotel elective.
Hours to be arranged. Faculty.
The student planning to be a teaching assistant in properties management is exposed to recommended techniques of instruction and such other methodology, reading, etc., as the professor in charge of the course may require.

751 Project Development and Construction Fall. 3 credits. Required M.P.S. course.
Lec, T R 8:30–9:45; 2-hour lab to be arranged.
M. H. Redlin.
The major elements of project development and construction are presented from an engineering management viewpoint. Topics include: feasibility studies, functional planning and design, financing techniques, the bidding process, construction contracts, project scheduling, and actual building construction. Techniques for effective graphic communication are developed and integrated into the design process.

752 Graduate Study in Electrical and Mechanical Systems Spring. 3 credits. Required M.P.S. course. Estimated cost of AIA articles and binders, $4.
Lec, T R 8:40–9:55; 2-hour lab to be arranged.
J. J. Clark.
The major electromechanical systems of large buildings and lodging properties are considered from a capital-cost versus operating-cost viewpoint. Systems considered include water, heating, refrigeration, air conditioning, electrical, and lighting. Concepts of energy conservation and efficient utilities management, beginning with the original selection of equipment through operating procedures, are emphasized. Students analyze case studies, criticize papers and reports, and suggest new systems and modifications.

Communication

161 Typewriting Fall or spring. 2 credits. Hotel elective.
M W F 10:10 or T R F 9:05. B. B. David.
A course in elementary typewriting, designed for students wishing to learn touch typing.

165 Report Writing Fall or spring. 3 credits. Required.
M T R 9:05, 10:10, 1:25, or 2:30. D. A. Jameson, D. G. Flash.
Written reports provide the information people and organizations need to form judgments and to make decisions. Without logical organization, careful data collection, and concise use of language, even the best-intentioned report can fail in its purpose. This course focuses on: strengthening skills in outlining and organizing; providing practice in preparation of both internal and external reports; using and understanding research sources; and developing skill in writing clearly and objectively.

261 Report Typing Fall or spring. 2 credits. Prerequisite: Hotel Administration 161 or equivalent. Limited to 24 students. Elective.
T R 10:10. B. B. David.
A course in electric typing designed for students who can type but who wish to improve their speed and accuracy. Special emphasis is placed on the typewritten report as a form of communication. Business letters are typed in various styles and their effectiveness is studied.

262 Typewriting and Business Procedures Fall or spring. Prerequisite: Hotel Administration 161 or equivalent. Limited to 24 students. Elective.
M W F 12:20. B. B. David.
Students who already know touch typing develop sufficient speed and accuracy on electric typewriters to meet business standards for an executive assistant in the typing and composing of business letters and special forms of business communication, including tabulated reports. Instruction in filing, duplicating processes, and machine transcription is provided.

263 Shorthand Theory Fall or spring. 3 credits. Prerequisite: a typing course. Limited to 35 students. Elective.
M W R 1:25. B. B. David.
The basic theory of Gregg shorthand is completed. Dictation and transcription speed is developed to meet the needs of a stenographic position.

265 Effective Communication Fall or spring. 3 credits. Limited to 25 students per section. Elective.
Lec, M 9:05–11 and W 9:05 or T 9:05–11 and R 9:05. Individual conferences arranged throughout the term. F. A. Herman.
This seminar is designed to help students (1) express themselves clearly and effectively and (2) acquire skills to better understand the ideas of others. Principles of the communication process are explored, tested, and reinforced during the term through classroom interaction, case studies, debates, and individual and group videotaped presentations.

268 Written Communication Fall or spring. 1 credit. S-U grades only. Limited to 18 students. Elective.
Hours to be arranged. M. M. Kreithen.
Principles and techniques of writing, including clarity, style, interest, and collection and presentation of data.

364 Managerial Letter Writing and Dictation Fall or spring. 2 credits. Limited to 24 upperclass and graduate students. Hotel elective.
R 11:15–1:10. M. M. Kreithen.
Students learn the techniques of good letter composition needed by an executive. Skill is developed in correct procedures for machine dictation and dictation to stenographers.

469 T.A. Training in Communication Fall or spring. 1–3 credits. Prerequisite: written permission of instructor. Hotel elective.
Hours to be arranged. Faculty.
The student planning to be a teaching assistant in communication is exposed to recommended techniques of instruction and such other methodology, readings, etc., as the professor in charge of the course may require.

Science and Technology

171 Food Chemistry I Fall. 3 credits. Required.
Lec, M W F 8; 1-hour lab to be arranged.
P. Rainsford.
Principles and concepts of inorganic and organic chemistry, with emphasis on the chemistry of fats, carbohydrates, and proteins.

172 Food Chemistry II Spring. 4 credits. Prerequisite: Hotel Administration 171 or equivalent. Required.
Lec, M W F 8; 3-hour lab to be arranged.
P. Rainsford.
The chemistry of fats, carbohydrates, and proteins is emphasized in relation to food products and food production techniques. The roles of additives in food, colloidal phenomena, food processing, and reconstitution techniques are studied.

173 Sanitation in the Food Service Operation Fall or spring. 2 credits. Required.
Lec, T 1:25; 2-hour lab to be arranged. J. C. White.
The causes and prevention of food spoilage and food-borne disease. Sanitary principles applied to the hospitality industry, including laws, rules, and regulations. Emphasis is on recent developments in the food service industry and on current outbreaks of food-borne illnesses.

174 Information Systems Fall or spring. 3 credits. Required.
M 1:25 and W 1:25–3:20. D. H. Ferguson.
An introduction to information systems and computing machines. Students learn basic programming skills for application to selected business problems. The concept of file processing is introduced to provide the student with an understanding of computing as it applies to the hospitality industry. Programs are executed on the University's computing system.

271 Introductory Nutrition Spring. 3 credits. Elective.
Hours to be arranged. Food science faculty.
The nutrient composition of fresh and processed foods; nutrient handbooks; recommended daily allowances; nutrition labeling; additives; special diets.

274 Hotel Computing Applications Fall or spring. 3 credits. Prerequisite: Hotel Administration 174 or equivalent. Hotel elective.
Lec. T 2:30–4:25, R 1:25; 2-hour lab to be arranged. R. G. Moore.
An examination of hotel and other service-related computing systems, with attention to electronic cash registers and point-of-sale devices.

374 Advanced Programming and System Design Fall or spring. 3 credits. Elective.
Hours to be arranged. R. G. Moore.
All phases of system analysis, design, programming, and testing of a module of an integrated hospitality information system, with emphasis on reports for decision making.

479 T.A. Training in Science and Technology Fall or spring. 1–3 credits. Prerequisite: written permission of instructor. Hotel elective.
Hours to be arranged. Faculty.
The student planning to be a teaching assistant in science or technology is exposed to recommended techniques of instruction and such other methodology, reading, etc., as the professor in charge of the course may require.

771 Graduate Food Chemistry Fall. 4 credits Required M.P.S. course.
Lec. M W F 10:10; 2½-hour lab to be arranged. Faculty.
The chemistry of fats, carbohydrates, and proteins is emphasized in relation to food products and food production techniques. Additives in foodstuffs, colloidal phenomena, food processing, and reconstitution techniques are studied.

774 Computers and Hotel Computing Applications Required M.P.S. course.
Lec. M 2:30–4:25, W 1:25; 2-hour lab to be arranged. R. G. Moore.
The first segment of the course is devoted to learning computer concepts and PL/1 programming. Programs written by the students are executed on the University's IBM 370/168 computer. During the second part of the course, the introduction of the computing machine to the hospitality industry is examined from several viewpoints: managerial impact, cost justification, user reaction, and guest satisfaction. The various successes and failures of hotel computing systems are analyzed in detail. Students in the course use a Sweda 800/80 front-office system.

Economics, Marketing, and Tourism

281 Macroeconomics Fall. 3 credits. Required.
M W 11:15, F to be arranged. W. H. Kaven.
Modern economic problems are examined in historical perspective, as national issues, and in the economic context of business decisions.

282 Microeconomics Spring. 3 credits. Required.
M W F 10:10 or 11:15. Faculty.
An analytical look at the basis of production and consumption behavior, market structures, the pricing system, resource allocations, market failures, and public policies directed toward these failures.

283 Principles of Marketing Fall. 2 credits. Hotel elective.
T 11:15–1:10. W. H. Kaven.
The economic prinicples of marketing, with emphasis on the marketing of services.

284 Tourism Fall. 3 credits. Hotel elective.
T 1:25, R 2:30–4:25. M. A. Noden.
The primary characteristics of foreign and domestic tourism. Areas of concern include geographic considerations, development of infrastructure and superstructure in host countries, travel delivery systems, and the social and cultural aspects of tourism. Transportation, the travel service industries, and the socioeconomic effects of tourism on developing countries are emphasized. Consideration is also given to travel research and marketing.

285 Hotel Sales Fall or spring. 2 credits. Hotel elective.
F 2:30–4:25. D. A. Dermody, M. Shaw.
A practical approach to the selling of hotel space with particular emphasis on selling to and effectively serving groups.

381 Advertising and Public Relations Fall. 2 credits. Limited to juniors, seniors, and graduate students. Hotel elective.
F 11:15–1:10. H. V. Grohmann.
This is the first of two courses covering the essential phases of hotel-motel marketing. Topics include advertising, publicity, public relations, and sales communication.

382 Cases in Hospitality Marketing Spring. 2 credits. Hotel elective. Prerequisite: Hotel Administration 283 or 781.
M 1:25–3:15. W. H. Kaven.
A continuation of Hotel Administration 381. A case-study course focusing on market planning; marketing strategy formulation; price, promotion, place, and product program design.

383 Seminar in Selected Topics in Hospitality Marketing Fall or spring. Prerequisite: Hotel Administration 283 or 781, or written permission. Hotel elective.
W 2:30–4:25. W. H. Kaven.
The marketing strategy and its development through opportunity analysis, research, and target market selection. The fall 1979 seminar covers promotional programs, including personal selling, advertising, public relations, and sales promotion; the spring 1980 topic is the integration of place, product, price, and promotion into a marketing plan. Students may enroll for any or all seminars according to their interests.

481 Seminar in Advertising and Public Relations Fall. 2 credits. Prerequisite: Hotel Administration 381. Hotel elective.
F 2:30–4:25. H. V. Grohmann.
Case histories of the advertising, publicity, business promotion, and public relations of hotels, resorts, restaurants and national travel attractions are studied.

483 Psychology of Advertising Fall. 3 credits. Prerequisites: Hotel Administration 111 and 283, or equivalent, or permission of instructor. Limited to 30 seniors and graduate students. Hotel elective.
M 2:30–5, and 7–9:30 p.m. alternate weeks.
P. C. Yesawich.
The principles of psychology employed in advertising. Topics include: learning, perception, motivation, advertising research, consumer behavior, and advertising strategy.

489 T.A. Training in Economics, Marketing, and Tourism Fall and spring. 1–3 credits. Prerequisite: written permission of instructor. Hotel elective.
Hours to be arranged. Faculty.
The student planning to be a teaching assistant in economics, marketing, or tourism is exposed to recommended techniques of instruction and such other methodology, reading, etc., as the professor in charge of the course may require.

781 Marketing Management Spring. 3 credits. Required M.P.S. course.
T 11:15–1:10, W 11:15. Faculty.
Hospitality marketing management decision making. Emphasis is on managerial analysis of the marketing environment; market opportunity analysis; and marketing strategy design, implementation, and control.

Independent Research

600–680 Undergraduate Independent Research Fall or spring. Variable credit. Prerequisite: written permission. Hotel elective. *Only the first three credits of directed study may count as hotel electives during the student's undergraduate academic career.* Additional directed study, if taken, is applied toward free electives, except for the work-study program of 12 credits. *Permission in writing is required prior to course enrollment.*
Faculty.
Students pursue independent research projects under the direction of a faculty member.

600 Administrative and General Management

601 Work Study — Operations 6 credits.

602 Work Study — Academic 6 credits.

610 Human Resources Management

620 Accounting and Financial Management

630 Food and Beverage Management

640 Law

650 Properties Management

660 Communication

670 Science and Technology

680 Economics, Marketing and Tourism

700–900 Graduate Independent Research Fall or spring. Variable credit. Prerequisite: permission of instructor. *Obtain permission form from the school's graduate office.* Limited to graduate students.
Faculty.
The student plans a project and locates a faculty member willing to supervise the study.

700 Administrative and General Management

710 Human Resources Management

720 Accounting and Financial Management

730 Food and Beverage Management

740 Law

750 Properties Management

760 Communication

770 Science and Technology

780 Economics, Marketing, and Tourism

800 Monograph I

801 Monograph II

802 Master of Science Thesis Research

803 Graduate Teaching Internship

900 Doctoral Thesis Research

New York State College of Human Ecology

Division of Student Services

Interdepartmental Courses

Field Study Office

T. Stanton, director; C. Cook, M. Holzer, M. Whitham

100 Data Gathering in the Field: Skills for Learning in a Field Study Setting Fall or spring. 1 credit. S-U grades optional. Limited to 25 students.
W 2:30–4:25 from September 12–October 17 and January 30–March 7 (6 workshops). C. Cook.
Workshops to train students in skills that will help them become more effective field learners and better able to cope with the complex demands of a field placement. Topics will include participant observation, active listening, investigative interviewing, understanding nonverbal communication, identifying sources of information in the community, and analyzing verbal presentations. All of the concepts are applied to assignments in the field.

200 Preparation for Fieldwork: Perspectives in Human Ecology Fall or spring. 3 credits. S-U grades optional. For students interested in preparing themselves for field experience. Limited to 20. Permission of the instructor required.
T R 10:10–12:05. M. Whitham.
Introduces students to field skills (such as interviewing, observation, public speaking, and discussion leading) and provides opportunities to practice and develop those skills. Additionally, small student task forces consider case studies highlighting complex issues in the interaction between community agencies and government regulation. Students work together to define problems, analyze and synthesize data from a variety of sources, and make group presentations.

400 Directed Readings For study that predominantly involves library research and independent reading.

401 Empirical Research For study that predominantly involves data collection and analysis.

402 Independent Field Learning Fall or spring. Credit to be arranged. S-U grades optional. Registration with permission of department faculty sponsor(s) and approval of the director of the field study program.
Hours to be arranged.
Provides an opportunity for students to develop field study experience within an interdisciplinary framework, usually under the supervision of faculty from two or more departments. Supervised field study involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

403 Teaching Apprenticeship For study that includes assisting faculty with instruction.

408 Organizations in the Delivery of Goods and Human Services Fall or spring. 15 credits. Limited to 20. Intended for human ecology upperclass students. Prerequisite: ID 200. Enrollment by permission of T. Stanton.
M. Holzer.
A full-semester, off-campus field course in the New York City metropolitan area designed to give an in-depth understanding of how contemporary organizations operate and the forces that influence the delivery of goods and human services. The course combines intensive participation in an organization that represents at least one of three perspectives (providers of goods and human services, policymakers and regulators, or community action and consumer groups) with a weekly seminar/workshop that provides the skills, concepts, and theories necessary for understanding and analyzing these organizations and the critical issues they face. Deadline for receipt of applications in the Field Study Office: October 12, 1979 for spring 1980; Feburary 22, 1980 for fall 1980.

Interdepartmental Major

See the Interdepartmental Major in Social Planning and Public Policy under the Departments of Consumer Economics and Housing and of Human Service Studies.

Counseling Office

R. J. Babcock, E. E. Martire, B. Morse, M. Thomas, R. West, N. Yaghlian
Special studies sponsored by counselors in the division deal with counseling theory and practice in relation to various student populations and career exploration.

400–401–402 Special Studies for Undergraduates Fall or spring. Credit to be arranged. S-U grades optional.
Hours to be arranged. Staff.
For independent study by an individual student in advanced work not otherwise provided in departments or for study on an experimental basis, with a group of students, in advanced work not otherwise provided in departments. Students prepare a multicopy description of the study they wish to undertake on forms available from the Counseling Office. Students, in consultation with their supervisor, should register for one of the following subdivisions of independent study.

400 Directed Readings For study that predominantly involves library research and independent reading.

401 Empirical Research For study that predominantly involves data collection and analysis or laboratory or studio projects.

402 Supervised Fieldwork For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

600 Special Problems for Graduate Students Fall or spring. Credit to be arranged. S-U grades optional. For graduate students recommended by their chairperson and approved by the assistant dean for student services and the members of the staff in charge of the problem for independent, advanced work.
Hours to be arranged. Staff.

Consumer Economics and Housing

E. S. Maynes, chairman; A. J. Davey, graduate faculty representative; H. B. Biesdorf, W. K. Bryant, P. Chi, S. Clemhout, M. S. Galenson, W. H. Gauger, J. Gerner, A. J. Hahn, B. Hall, M. Johnson, M. Lea, C. Meeks, J. Robinson, N. C. Saltford, J. Swanson, E. Wiegand

100 Introduction to Consumer Economics Fall or spring. 3 credits. S-U grades optional. Students who have taken Econ 101 or another introductory macroeconomics course should not register. Enrollment limited to 120.
Fall: M W F 1:25; J. Robinson. Spring: M W F 11:15; staff.
An introductory course designed to provide a basic understanding of macroeconomics, with particular attention to those areas affecting families. The course will cover national income accounting, income distribution, prices, and monetary and fiscal policy. This will serve as a basis for the study of income redistribution programs and other areas of government action.

147 Housing and Society Fall or spring. 3 credits. S-U grades optional. Enrollment limited to 5 sections of 20 students each.
Lec, T R 11:15. Sections: T 1:25 or 3:35; W 1:25; R 9:05 or 1:25. P. Chi, C. Meeks.
A survey of contemporary American housing issues as related to the individual, the family, and the community. The course focuses on the current problems of the individual housing consumer, the resulting implications for housing the American population, and governmental actions to alleviate housing problems.

148 Sociological Perspectives on Housing Spring. 3 credits. S-U grades optional. No prerequisites. Enrollment limited to 5 sections of 12 students each. Information regarding section hours will be available at course registration.
Lec, T R 10:10. Staff.
A theoretical and empirical analysis of housing patterns in the United States from a sociological perspective. Topics include migration patterns, residential mobility, suburbanization, and the structure and function of neighborhoods. Emphasis is on explaining the widespread patterns of segregation in the United States by race, ethnicity, and social class.

233 Marketing and the Consumer Spring. 3 credits. S-U grades optional. Prerequisite: microeconomics.
M W F 8. N. C. Saltford.
A study of marketing functions, institutions, policies, and practices with emphasis on how they create consumer satisfaction. A marketing project with a nearby consumer products firm and a field trip to New York City to study selected marketing operations are arranged when feasible.

248 Housing and Local Government Fall. 3 credits. S-U grades optional. Prerequisite: Econ 102.
T R 10:10–11:25. M. Lea.
Analysis of state and local government tax, expenditure, and regulatory activities that affect the housing market. Detailed consideration will be given to property taxation, provision of local public goods, zoning, housing and building codes, and other government policies that deal with housing and neighborhood environment.

300 Special Studies for Undergraduates Fall or spring. Credit arranged.
Hours to be arranged. Staff.
Special arrangement for course work to establish equivalency for courses not transferred from a previous major or institution. Students prepare a multicopy description of the study they wish to undertake on forms available from the Division of Academic Services. The form, signed by both the instructor directing the study and the head of the department, is filed at course registration or during the change-of-registration period.

312 Decision Making in the Family Fall or spring. 3 credits. S-U grades optional. Enrollment limited to 28; preference given human ecology juniors and seniors. Not open to freshmen.
T R 1:25–3, other hours to be arranged. A. Davey.
Decision making is studied in relation to goal formation and goal attainment within the economic and social context of the family. Factors that expand and limit alternatives are examined. Field trips are included. Students elect a practical application that may include a live-in experience in Apartment A or an independent exploration of some phase of family

decision making. Course fee is $19 per week for the live-in experience (average time is three weeks).

325 Economic Organization of the Household Fall. 3 credits. S-U grades optional. Prerequisite: Econ 102 or equivalent.
M W F 9:05. K. Bryant.
Theories and empirical evidence on how households spend their resources are used to investigate how households alter the amounts and proportions of time and money spent in various activities, their size, and their form in response to changing economic forces.

330 Personal Financial Management Fall or spring. 3 credits. S-U grades optional. Enrollment limited to 200. Preference given to human ecology students; not open to freshmen.
Fall: M W F 1:25; R. Heck. Spring: M W F 9:05; J. Robinson.
The study of personal financial management at various income levels and during different stages of the family life cycle. Topics covered will include the use of budgets and record keeping in achieving family economic goals; the role of credit and the need for financial counseling; economic risks and available protection; and alternative forms of saving and investment.

332 Consumer Decision Making Spring. 3 credits. Prerequisite: Econ 101–102 or permission of instructor.
M W F 2:30. E. S. Maynes.
This course is designed to help students make more effective choices as consumers through an understanding of the economy and the use of relevant economic and statistical principles. The course is normative, stressing how consumers should act in order to achieve their goals.

341 Fundamentals of Housing Economics Fall. 3 credits. S-U grades optional. Prerequisite: Econ 101–102 or equivalent. Offered 1979–80 and alternate years.
M W F 1:25. J. Gerner.
To give a basic understanding of the structure and operation of the housing market, the economic determinants of housing supply and demand are related to (1) levels of housing consumption and housing standards, (2) the composition of the housing inventory, and (3) levels of and fluctuations in housing production.

355 Wealth and Income Spring. 3 credits. S-U grades optional for nonmajors. Open to sophomores, juniors, and seniors. Graduate students may elect to audit and write a research paper for one to two credits under CEH 600. Prerequisites: Econ 101–102 or equivalent.
M W F 10:10. J. Gerner.
Examination of contemporary economic problems that affect the welfare of families in the United States. Examples are affluence and poverty; monetary and fiscal policies as these affect families; and efficacy of the delivery of public services in the areas of health, education, and subsidized housing. Where relevant, the historical origin of these problems will be studied.

400–401–402 Special Studies for Undergraduates Fall or spring. Credits to be arranged. S-U grades optional.
Hours to be arranged. Staff.
For advanced, independent study by an individual student or for study on an experimental basis with a group of students in a field of CEH not otherwise provided through course work in the department or elsewhere at the University. Students prepare a multicopy description of the study they wish to undertake on forms available from the Counseling Office. This form must be signed by the instructor directing the study and the department chairman and filed at course registration or within the change-of-registration period after registration. In order to ensure review before the close of the course registration or change-of-registration period, early submission of the Special Studies Form to the department chairman is necessary. Students, in consultation with their supervisor, should register for one of the following subdivisions of independent study:

400 Directed Reading For study that predominantly involves library research and independent reading.

401 Empirical Research For study that predominantly involves data collection and analysis or laboratory or studio projects.

402 Supervised Fieldwork For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

411 Time: Its Meaning and Use in Families Fall. 3 credits. S-U grades optional. Prerequisites: one course in sociology; one course in microeconomics recommended. Enrollment limited to 20.
M W F 11:15. Staff.
Seminar based on historical and contemporary readings. Investigates changes in time use of family members in relation to social change. Explores meanings of employment, work at home, and leisure in the context of family choices at different stages of the life cycle. Examines use of time as a measure of activities and nonmarket household production. Culminating experience is an individual project or paper relating course concepts to student's professional interests.

[413 An Ecological Approach to the Resource Management of Families Spring. 2 credits. Field experience option, one additional credit hour. Enrollment limited to 20. Offered 1980–81 and alternate years.
M W 1:25. A. Davey.
Examination of managerial problems faced by families with imbalances in resources. Analysis of techniques of compensating for resource limitation of families in poverty, with health handicaps, with young mothers in the labor force, one-parent families, student couples, and retired couples. Suggested for students preparing to work with families in health and rehabilitation programs, social work, geriatrics, secondary and adult education, and financial counseling.]

425 Economics of Recreation and Leisure Spring. 3 credits. S-U grades optional. Prerequisite: microeconomics; a course in sociology recommended. Offered 1979–80 and alternate years.
T R 8–9:15. W. Gauger.
The course focuses on leisure time use and views recreational activities as consumer goods that are subject to economic decisions on the allocation of time and money. Empirical observations and data will be examined for theoretical insights.

430 The Economics of Consumer Policy Fall. 3 credits. Prerequisites: Econ 101–102, or permission of instructor.
M W F 2:30. E. S. Maynes.
Students are aquainted with the basic approaches to consumer policy and perform economic analyses of specific consumer policy issues. Consumer sovereignty, the consumer interest, and consumer representation are all dealt with, along with economic analyses of current and enduring consumer policy proposals and programs.

441 Housing Finance Spring. 3 credits. S-U grades optional. Prerequisites: Econ 101–102, CEH 147.
T R 8–9:55. C. Meeks.
Examines the residential financing process, alternative instruments, and sources of credit. Both primary and secondary mortgage markets are discussed as well as the impact of legislation on these markets. Also examined are the implications of the financing process for consumers.

443 The Social Effects of the Housing Environment Fall. 3 credits. S-U grades optional. Prerequisite: CEH 147 or CEH 148.
T R 2:30–3:45. Staff.
A seminar dealing with the interplay of housing and human behavior. Physical and social deterministic viewpoints are considered. Discussion of substantive issues including the effect of housing on crime rates, health, racial attitudes, and satisfaction. Research skills are developed to analyze and evaluate critically the literature in the field.

449 Housing Policy and Housing Programs Spring. 3 credits. S-U grades optional. Prerequisites: Econ 101 or equivalent and CEH 147.
T R 10:10–11:25. M. Lea.
Critical examination of the development and current state of federal and selected state housing policies. Beginning with the rationales for government housing policy, the course will examine the purposes of various housing programs, assess their operation and potential for continued effective functioning. Topics include public housing, cash-based housing programs, urban renewal, and the operation of the secondary mortgage market. The applications and effects of state and federal housing policies in New York City will be addressed.

465 Consumer and the Law Fall. 3 credits. S-U grades optional. Prerequisite: CEH 100 or equivalent.
T R 10:10–11:25. Staff.
The operations of federal agencies and the courts in various consumer areas, including compensation for injury from defective products, deceptive advertising, the Fairness Doctrine in television and radio broadcasting, the regulation of food and pharmaceutical drugs, class actions, fraud, and a proposed consumer protection agency.

472 Community Decision Making Fall. 3 credits. S-U grades optional. Prerequisite: Govt 111 or equivalent.
T R 8–9:55. A. Hahn.
Identification and discussion of factors that influence the outcomes of community issues. Topics include political participation, decision-making processes, the interests and resources of key decision makers, and community change. Concurrent participation in community activities is desirable but not required.

480 Welfare Economics Fall. 3 or 4 credits. S-U grades optional. Prerequisite: permission of instructor before preregistration.
M W F 9:05. S. Clemhout.
A study of the social desirability of alternative allocation of resources. Topics include Pareto Optimality, external effects on production and consumption with applications to problems of environmental quality, public expenditure decisions, measurement of welfare, and evaluation of relevant public policy issues.

485 Public and Private Decision Making Spring. 3 credits. Prerequisite: an intermediate microeconomic theory course or equivalent. Offered 1979–80 and alternate years.
T R 2:30–3:45. M. Lea.
This course will focus on the demand for and provision of public goods and the evaluation of government programs providing such goods. Individual demand for public goods as expressed through voting and other ways that reveal preferences will be examined, as will the behavior of bureaucracies and other institutions providing public goods. Cost-benefit analysis as a tool of evaluation will be discussed and programs in both the consumer and housing areas will be evaluated as case studies.

600 Special Problems for Graduate Students Fall or spring. S-U grades optional.
Hours to be arranged. Staff.
Independent advanced work by graduate students recommended by their chairperson and approved by the head of the department and the instructor.

[601 Research Methods in the Social Sciences Spring. 3 credits. Prerequisites: a statistics course and permission of instructor. Offered 1980–81 and alternate years.
T 1:30–4:30. E. S. Maynes.
Preparation of first- and second-year graduate students as consumers and producers of research. In the first part of the course, students receive a critical review of a selection of research methods and studies from the relevant social sciences. In the second part, students prepare their own research proposals, often with an eye to later M.S. or Ph.D. thesis development.]

619 Seminar in Family Decision Making Fall. 3 credits. S-U grades optional. Prerequisite: graduate standing. Consult instructor before registering. Offered 1979–80 and alternate years.
W F 10:10–11:25. A. Davey.
An in-depth study of family decision making based on the several approaches found in the literature of home or family management.

[621 Explorations in Consumer Economics Spring. 3 credits. S-U grades optional. Prerequisite: permission of instructor. Not offered 1979–80.
Hours to be arranged. Staff.
With the guidance of the instructor, students will select and investigate independently a substantive current consumer issue. Topic selected must be one that can be studied within both an economic and an institutional framework. Students will present status reports of their investigation to the group regularly for criticism and feedback. A term paper is required.]

626 Economics of Household Behavior I Fall. 3 credits. S-U grades optional. Prerequisite: Econ 311 or concurrent enrollment in Econ 311.
M W F 10:10. K. Bryant and J. Gerner.
Introduction at graduate level to theory and empirical research on household demand, consumption, saving, and market work, with implications for current policy issues. Provides introduction to more advanced treatment of market work, household production, and economics of the family presented in CEH 627.

627 Economics of Household Behavior II Spring. 3 credits. S-U grades optional. Prerequisites: Econ 311 and CEH 626.
T R 10:10–11:25. K. Bryant and J. Gerner.
Further examination of theoretical and empirical literature concerning market work, household production, and family formation, as well as policies in these areas. Based on introduction provided in CEH 626.

[630 Family Financial Management Spring. 3 credits. S-U grades optional. Prerequisite: CEH 330 or equivalent. Not offered 1979–80.
Hours to be arranged. Staff.
Family financial management is studied with emphasis on role of financial consultant. Each student works with one or more families. Designed to increase awareness and knowledge of characteristics of persons in serious financial difficulties, complexity of factors affecting such situations, desirable relationships between helper and helped, and community agencies and organizations with appropriate resources.]

640 Fundamentals of Housing Fall. 3 credits. S-U grades optional. Prerequisite: graduate standing or consent of instructor.
W 3:35–5:15. P. Chi.
An introductory survey of housing as a field of graduate study. Consideration of the spatial context and institutional setting of housing; the structure and performance of the housing market; housing finance; the housing-building industry; the nature and impact of government housing programs, the social and economic effects of housing regulations.

[642 Advanced Housing Market Analysis Fall. 3 credits. S-U grades optional. Prerequisite: Econ 311 or equivalent. Offered 1980–81 and alternate years. Not offered 1979–80.
R 2:30–5. M. Lea.
The interaction of supply and demand in the housing market studied from a spatial perspective through location theory and the development of metropolitan areas, and from a time perspective involving new construction and residential filtering. Topics to be studied include both theoretical and empirical location models, empirical housing demand and supply studies, optimum city size, property value and rent determination models and housing discrimination studies.]

648 Demographic Aspects of Housing Fall. 3 credits. S-U grades optional. Prerequisite: graduate standing or consent of instructor.
R 2:30–4:25. P. Chi.
This course is concerned with the dynamic relationship between population and the housing market. The size and composition of the population, components of population growth, population distribution, and residential location will be analyzed in light of the amount and quality of the housing stock. The course will use techniques and models for population and housing projections at both national and subnational levels. A set of computer programs will help students actually use various techniques to project population structure and housing demand.

[649 Advanced Housing Policy Analysis Fall. 3 credits. S-U grades optional. Prerequisite: Econ 311 or equivalent. Offered 1980–81 and alternate years. Not offered 1979–80.
R 2:30–5. M. Lea.
Study of state, local, and federal policies affecting housing markets, from theoretical and quantitative standpoints. Examination of the purpose and impact of various policies including zoning, property taxation, housing finance and rent subsidies, public housing, urban renewal.]

665 Seminar on Consumer Law Problems Spring. 3 credits. S-U grades optional. Open to CEH graduate students and to others with permission of instructor. Enrollment limited to 20.
T 10:10–12:05. Staff.
A study of areas of current interest to consumers involving the law as developed by regulatory commissions and the courts, with emphasis on the institutional and economic background. The aim is to encourage critical examination of policy issues and their social and economic effects on families.

671 Intergovernmental Relations and Local Community Change Spring. 3 credits. S-U grades optional. Prerequisite: CEH 472, equivalent course in local government and politics, or permission of instructor.
T R 8–9:55. A. Hahn.
Description and analysis of the intergovernmental system with special attention to the relationships between local communities and state and federal governments.

680 Applied Welfare Economics — Policy Issues Spring. 3 credits. S-U grades optional. Permission of instructor required.
M W F 9:05. S. Clemhout.
Topics vary from year to year. The objective of the course is to evaluate the economic impact of various policies in conjunction with the efficiency of existing institutions. Policy issues covered include education (effects of automation and so forth), health, and environmental problems (urban development or transportation, for example). Attention is given to the interrelationship of policy and planning within the larger economic and sociopolitical framework.

697 Seminar Fall or spring. Noncredit course.
M 4–5. Staff.
Planned to orient students to graduate work in the field, to keep students and faculty abreast of new developments and research findings, to acquaint them with topics in related areas, and to examine and discuss problems of the field.

726 Consumption Theory Spring. 3 credits. S-U grades optional. Prerequisite: intermediate economics theory or permission of instructor. Offered 1979–80 and alternate years.
M W 1:25–3:20. K. Bryant.
Major developments in the theory of household behavior with applications to consumption, saving, physical asset, debt, and liquid asset positions of households; demand and expenditure analyses; economics of consumer information; market work and housework activities of households; economics of household size and form.

[727 Human Capital Fall. 3 credits. S-U grades optional. Prerequisite: intermediate economic theory or permission of instructor; CEH 411 recommended but not required. Offered 1980–81 and alternate years. Not offered 1979–80.
Hours to be arranged. J. Gerner.
This course examines the public sector policies that influence family time allocation decisions. Particular attention will be given to the time allocated by female family members to nonhousehold activities and how these activities are influenced by outside economic forces and by internal family characteristics.]

[740 Seminar in Current Housing Issues Spring. 3 credits. S-U grades optional. Permission required.
F 9:05–11. Staff.
Focuses on a selected group of national issues related to housing. The issues evaluated vary from year to year, based on current importance and student interest. When possible, this course presents present or recent research, with emphases on both content and methodology.]

743 Readings in Housing Spring. 2 credits. S-U grades optional. Registration with permission of instructor.
Hours for discussion of readings to be arranged. Staff.

758 Seminar for Doctoral Candidates Fall. 2 credits. S-U grades optional.
Staff.
Review of critical issues and thought in consumer economics and public policy questions.

899 Master's Thesis and Research Fall or spring. S-U grades optional. Registration with permission of the chairperson of graduate committee and the instructor.
Graduate faculty.

999 Doctoral Thesis and Research Fall or spring. S-U grades optional. Registration with permission of the chairperson of graduate committee and the instructor.
Graduate staff.

Design and Environmental Analysis

R. Steidl, chairman; N. C. Saltford, graduate faculty representative; G. Atkin, R. Barker, F. D. Becker, M. Boyd, A. Bushnell, C. C. Chu, P. Eshelman, C. E. Garner, B. A. Lewis, W. J. McLean, S. H. Mensch, G. C. Millican, S. K. Obendorf, E. R. Ostrander, M. Purchase, A. Rachun, A. Racine, R. Rector, G. Sloan, C. Straight, V. Szczepanski, S. S. Watkins, M. V. White, C. Williams, C. Yackel

101 Design I: Fundamentals A Fall or spring. 3 credits. Each section limited to 23.
M W 1:25–4:25; or T R 10:10–1:10 or 1:25–4:25.
M. Boyd, C. Straight.
A studio course introducing the fundamental vocabulary and principles of design. Students

experiment with the development of form through problem-solving approaches. Approximate cost of materials, $50.

102 Design I: Fundamentals B Spring. 3 credits. Each section limited to 23. Prerequisite: DEA 101.
M W 1:25–4:25; or T R 8–11. M. Boyd, A. Bushnell, C. Straight.
A study of visual organization including problems of color and visual perception. Emphasis on the development of visual sensitivity, imagination, and problem structuring, utilizing simple materials to produce abstract solutions. Approximate cost of materials, $35.

111 Theory of Design Spring. 3 credits. Enrollment limited to 120; DEA majors given priority.
M W F 11:15. C. Williams.
Introduction to the field of design for the student in any academic area. The course reviews the spectrum of design activities, examining various movements in the visual arts and differences among designers in philosophical premises, social and functional roles, and cultural positions. Also examined are requirements in the man-made environment as affected by the interaction of people, design, and materials. Lectures and visual material are presented by DEA faculty and visiting design professionals.

115 Drawing Fall or spring. 3 credits. Each section limited to 25.
M W 1:25–4:25, or 7:30–10:30 p.m.; or T R 1:25–4:25. P. Eshelman, S. Mensch, V. Szczepanski.
A studio drawing course. Short demonstrations or lectures on the ideas and techniques of drawing are presented every week. The student is introduced to the functions of line, shape, and value as they apply to design. Drawing from the figure and from inanimate objects, perspective, and conceptual drawing are emphasized. Minimum cost of materials, $15.

117 Drawing the Clothed Figure Spring. 3 credits. S-U grades optional. Enrollment limited to 25. Prerequisites: DEA 115 or equivalent. Priority given to DEA Option IB and II majors.
M W 8–11. C. Garner.
Intended to improve students' ability to illustrate two-dimensionally the interaction of draped fabric and the human form and to develop awareness of clothing as a design medium. Emphasis is on development of techniques and skills in selected media necessary for professional communication of design ideas. Approximate cost of textbook and supplies, $25–50.

135 Textiles I Fall. 3 credits. Prerequisite or corequisite: Chem 103 or 207. Each lab limited to 20.
Lec, M W 10:10; lab, T or W 2:30–4:25. R. Barker.
An introduction to the basic properties of textile materials, with consideration of their technology, consumer uses, and economic importance. Behavior of textile materials is observed in a variety of environmental conditions that influence aesthetics, comfort, and performance. This course is designed to provide a basis for further study in textiles, but it also contains sufficiently broad coverage of the subject to be used as an elective course. Maximum cost of supplies and textbook, $30.

145 Apparel Design I Fall or spring. 4 credits. Each laboratory section in the fall limited to 25; spring lec and lab sections limited to 40. Prerequisite: basic sewing skills. Those with formal course work in pattern design may take an exemption exam by contacting instructor the first day of registration.
Fall: lec T R 1:25; lab M W 2:30–4:25 or T R 2:30–4:25. Spring: lec and lab, M W 7:30–10:30 p.m. A. Racine.
Intensive study of principles and processes of flat pattern design and fitting techniques with emphasis on development of creative expression. Approximate cost of supplies, $30 plus fabric for final project. Sewing skills are not taught. For those with limited skills, an autotutorial laboratory must be scheduled concurrently or prior to enrollment. Contact the instructor. Materials for autotutorial laboratories, $10.

150 Environmental Analysis: Human and Social Factors Fall. 3 credits. Required for DEA majors, who must complete the course in the freshman or sophomore year.
M W F 12:20. F. Becker, G. Sloan.
Introduction to study of relations between physical environment and behavior of individuals and groups. Perception of space and effects of spatial arrangements on interactions between persons. Significance of human capabilities and limitations as factors in designing person-environment systems. Guidelines for analyzing environmental conditions.

201–202 Design II 201, fall; 202, spring. 6 credits per term. Prerequisites: DEA 101; DEA 115 prerequisite or corequisite with 201; DEA 102 prerequisite or corequisite with 202; or permission of instructor; recommended: DEA 111, 150. Each section limited to 20.
M W 8–11 and T R 1:25–4:25; or M W 1:25–4:25 and T R 8–11. A. Bushnell, P. Eshelman, S. Mensch, C. Williams.
A studio course emphasizing the conceptualization of form as a function of the theory and handling of materials. Included are basic drafting, model building, and presentation drawing. The course is structured around a series of design problems, three to five weeks in length, using wood, plastic, metal, glass, ceramics, concrete, and textiles. Where possible, problems include the handling of the actual materials. Minimum cost of materials, $60 per semester; shop fee, $10. Additional spring fees: darkroom fee, $10; optional field trip, approximately $60.

230 Science for Consumers Fall. 3 credits. S-U grades optional. Limited to 20 students per lab. Prerequisite: high school or college chemistry or physics. Not open to students who have taken DEA 434.
Lec, T R 9:05; lab, W 12:20–2:15 or W 2:30–4:25. M. Purchase.
Principles of science related to consumer problems, such as energy conservation in the home, electricity in dwellings, heat transfer, control of temperature, humidity, sound and odors in dwellings, mechanics of equipment, chemistry of cleaning agents, and chemical characteristics of surfaces to be cleaned. Particularly valuable for environmental designers and analysts and students planning to work with consumers as teachers, extension workers, home service personnel, or consultants.

235 Textiles II Spring. 3 credits. Limited to 16 students per lab. Prerequisites: DEA 135 and 2 semesters of chemistry.
Lec, T 9:05; lab, T R 10:10–12:05 or M W 1:25–2:30. S. K. Obendorf.
A study of critical performance characteristics of textiles, and the relation of these characteristics to use of textile articles. Emphasis in both lecture and laboratory is on comfort, durability, and special performance characteristics. Also included is study of the purposes, scope, and limitations of laboratory textile testing, and the relations between laboratory testing and end-use performance.

240 Clothing Through the Life Cycle Spring. 3 credits. Not open to students who have taken DEA 445.
M W F 12:20. S. Watkins.
An introduction to clothing as it affects the physical and psychological well-being of the individual. Emphasis will be placed on the functional aspects of clothing for individuals from infancy through old age and for groups such as the handicapped or those in special occupations. Students will explore the resources available to the designer for solving clothing problems.

245 Dress: A Reflection of American Women's Roles Fall. 3 credits. S-U grades optional. Enrollment limited to 40.
M 7:30–10:30 p.m. A. Racine.
A historical survey of changing patterns of American women's dress from the colonial period to present day, as well as the sociocultural forces that affected women's development within the social class structure. The Cornell Costume Collection and illustrated lectures are used to develop an awareness of historic costume, while assigned readings will focus on expected roles. Students will investigate topics dealing with the impact of dress on cultural assimilation of minority women in America.

250 Environmental Psychology: Perspectives and Methods Fall. 3 credits. Prerequisite: DEA 150 or permission of instructor. Graduate students should enroll in DEA 660 concurrently with 250.
T R 10:10–11:30. F. Becker.
Course focuses on issues central to study of person-environment relationships and the uses of evaluation research in the design process.

251 Historic Design I: Furniture and Interior Design Fall. 3 credits. Prerequisites: DEA 101 and 111. Recommended sequence: DEA 251, 252, and 353.
M W F 11:15. G. C. Millican.
A study of the patterns of historical development and change in furniture and interiors from man's earliest expressions through the eighteenth century as they reflect the changing cultural framework of Western civilization, excluding America.

252 Historic Design II: Furniture and Interior Design Spring. 3 credits. Prerequisite: DEA 101; corequisite: DEA 111. Recommended sequence: DEA 251, 252, and 353.
M W F 8. G. C. Millican.
A study of the patterns of historical development and change as revealed through American furniture and interiors, 1650–1885. Design forms are considered individually, collectively, and in their historical context as they express the efforts, values, and ideals of American civilization.

261 Fundamentals of Interior Design Fall. 3 credits. Enrollment limited to 20. Prerequisite: DEA 101.
T R 1:25–4:25. G. C. Millican.
A studio course that emphasizes the fundamental principles of design applied to the planning of residential interiors and coordinated with family and individual needs. Studio problems explore choices of materials, space planning, selection and arrangement of furniture, lighting, and color. Illustrated lectures, readings, and introductory drafting and rendering techniques are presented. Minimum cost of materials, $30.

264 Apparel Design II Fall. 3 credits. Prerequisites: DEA 145 and completion of or concurrent registration in DEA 101 and 135; recommended: DEA 115 and 240.
T R 1:25–4:25. C. Yackel.
A studio course interrelating two techniques for designing apparel: draping and advanced flat pattern. Problems require the student to make judgments regarding the design process, nature of the materials, body structure, and function. Minimum cost of materials, $40.

300 Special Studies for Undergraduates Fall or spring. Credit to be arranged.
Hours to be arranged. Department faculty.
Special arrangement for course work to establish equivalency for courses not transferred from a previous major or institution. Students prepare a multicopy description of the study they wish to undertake on forms available from the Division of Academic Services. The form, signed by both the instructor directing the study and the head of the department, is filed at course registration or during the change-of-registration period.

301—302 Design III 301, fall; 302, spring. 6 credits per term. Prerequisites: DEA 201–202.
M T W R 1:25–4:25. P. Eshelman, S. Mensch, V. Szczepanski.
A studio course emphasizing the conceptualization of form as a function of human and social factors. Environmental analysis concepts and techniques are studied to provide design students with enough understanding to begin a behaviorally-based design project. Several short-term problems are explored in the fall semester. More complex problems are undertaken in the spring semester. Minimum cost of materials, $60 per semester.

330 Household Equipment Principles Spring. 3 credits. S-U grades optional. Prerequisites: NS 146 or DEA 135 or DEA 230.
M W 2:30–4:25. M. Purchase.
Principles of operation of appliances for food preparation and preservation, cleaning, laundering, temperature and humidity control, and lighting. Use of energy by appliances. Evaluation of features in relation to their functions and cost. Selection, use, and care of household equipment. Individual study related to the student's background and interests.

335 Textiles III: Structure and Properties Spring. 4 credits. Prerequisites: DEA 235; Phys 101, 112, or 207; and Chem 253 and 251, or 357–358 and 251.
Lec, M W F 12:20; plus 3-hour lab to be arranged. C. C. Chu.
An in-depth study of the structures of textile materials and their component parts, from polymer molecules through fibers and yarns to fabrics, and the techniques of controlling structure to achieve desirable end-use properties. Particular emphasis is placed on properties important to the consumer, including easy care, elasticity, durability, comfort, and aesthetics. Laboratory experimentation illustrates the important interrelationships among structures and properties of polymers, fibers, yarns, and fabrics.

338 Textiles for Interiors and Exteriors Spring. 3 credits. S-U grades optional. Prerequisites: DEA 235 or permission of instructor.
M W 7:30–9:30 p.m. V. White.
Through lectures, seminars, and laboratory experiences, students examine interior and exterior environments and their interaction with textiles. Physical and chemical properties of fiber, yarn, and fabric are studied relative to product requirements such as product reliability, safety, performance, and aesthetics. Communication at consumer, government, and industry interfaces is considered.

[342 Design: Weaving Fall or spring. 3 credits. Limited to 12. Prerequisite: DEA 101; recommended: DEA 102, 115, 135. Not offered 1979–80.
A studio course encompassing the basics of weaving and the functioning of a loom. Using a variety of fibers, yarns, and other materials, students are introduced to design possibilities on the loom. The students explore relationships between color, design technique, and function is considered by weaving a number of experimental samples and several more complicated woven projects. Minimum cost of materials, $65.]

343 Design: Introductory Textile Printing Fall. 3 credits. Each section limited to 15. Prerequisites: DEA 101 and at least one other studio design course.
M W 1:25–4:25 or T R 10:10–1:10. C. Straight.
A studio course exploring the print as a design form. Silk-screen printing is the basic process used, but opportunities are provided for using other processes. Minimum cost of materials, $50.

349 Graphic Design Fall or spring. 3 credits. Enrollment limited to 18. Prerequisite: DEA 201 or permission of instructor. Priority given to DEA majors.
M W 7:30–10:30 p.m. M. Boyd.
The fundamentals of lettering, typography, layout, and presentation techniques. Printing processes and the use of photography and illustration also are covered. Consideration is given to graphics in product and interior design, packaging, exhibit design, and informational systems. Approximate cost of materials, $25.

350 Environmental Analysis: Person, Activity, Space Spring. 3 credits. Prerequisite: introductory psychology; recommended: DEA 150 and a course in human physiology.
M W F 12:20. G. Sloan.
Implications of human characteristics and limitations on the design and modification of the built environment. Human costs (physical and mental, including effort, fatigue, stress) provide guides for reducing the amount of adaptation to man-shaped objects, spaces, and activities. Application of human factor constructs, data, and problem-solving strategies to near environment problems.

351 Selected Topics in History of Costume Spring. 3 credits. S-U grades optional. Recommended: courses in history of art or cultural history.
M W 10:10–12:05. C. Yackel.
A study of the relationship between costume and culture in selected periods of history from ancient times to the present. History is used as a resource for solving contemporary apparel needs. Lectures and class discussion are illustrated with items from the Cornell Costume Collection.

353 Historic Design III: Contemporary Design Spring. 3 credits. Prerequisite: DEA 101; corequisite: DEA 111. Recommended sequence: DEA 251, 252, and 353.
M W F 11:15. G. C. Millican.
A historical study of the emergence and development of contemporary design, 1885 to present. Examines the social, economic, technical, and stylistic forces that shape the design forms of the present and includes a critical analysis of selected works of furniture, fabrics, and interiors.

361 Residential Design Spring. 3 credits. Prerequisite: DEA 201 or 261, or permission of instructor; recommended: DEA 135 and 350.
T R 8–11. G. C. Millican.
An introduction to residential architectural design. While designing a solution for specific occupant needs, students consider site, orientation, climate, and materials. Drafting room work consists of plans, elevations, perspectives, and presentation of solutions. Lectures, discussions, and required readings. Approximate cost of materials, $30.

367 Apparel Design III Spring. 4 credits. Prerequisites: DEA 111, 115, 150, 240, and 264; corequisites: DEA 235 and 117.
T R 1:25–4:25. C. Yackel.
A studio course covering color theory, form study, accessory work, and the use of nontraditional materials for body coverings. Development of the design process as it relates to problem solving will be stressed. Problems focus on the aesthetic and functional nature of dress. The Cornell Costume Collection is used for illustration and inspiration. Minimum cost of materials, $50.

400–401–402 Special Studies for Undergraduates Fall or spring. Credit to be arranged. S-U grades optional.
Hours to be arranged. Department faculty.
For advanced, independent study by an individual student or for study on an experimental basis with a group of students in a field of DEA not otherwise provided through course work in the department or elsewhere at the University. Students prepare a multicopy description of the study they wish to undertake on forms available from the Counseling Office. This form must be signed by the instructor directing the study and the department chairman and filed at course registration or within the change-of-registration period after registration. In order to ensure review before the close of the course registration or change-of-registration period, early submission of the Special Studies Form to the department chairman is necessary. Students, in consultation with their supervisor, should register for one of the following subdivisions of independent study:

400 Directed Readings For study that predominantly involves library research and independent reading.

401 Empirical Research For study that predominantly involves data collection and analysis or laboratory or studio projects.

402 Supervised Fieldwork For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

430 The Textile and Apparel Industries Fall. 3 credits. Prerequisites: CEH 233, DEA 235, or permission of instructor.
M W 12:20–2:15. N. Saltford.
A critical review of the textile and apparel industries including structure and marketing practices, and government policies that affect industry decisions and operations in such areas as energy, the environment, safety, international trade, and employee benefits and opportunities. The role of trade unions also is explored. A one-day field trip is arranged when feasible.

[431 The Textile and Apparel Industries—Field Experience Second week of January intersession. 1 credit. Prerequisite or corequisite: DEA 430. Offered alternate years; next offered 1980–81.
N. Saltford.
A one-week field experience in the textile regions of the South. Students have the opportunity to see various textile processes including fiber production, knitting, weaving, dyeing and finishing, and designing. In addition, seminars with executives of each participating firm relate theory to current practice. Students are responsible for trip expenses, approximately $175.]

[434 Care of Textiles Fall. 2 credits. Prerequisite: DEA 235. Not open to students who have taken DEA 230. Offered alternate years; next offered 1980–81.
M. Purchase.
The course will center on the interaction of textiles with soils and stains, cleaning agents, and laundry equipment. Topics will include characteristics of soils, mechanisms for bonding soils to substrates, textile properties and changes related to care processes, functional finishes, wet- and dry-cleaning processes, the supplies and techniques used in cleaning, and instructions for care.]

436 Textiles IV: Textile Chemistry Fall. 4 credits. Prerequisites: DEA 235; Chem 253 and 251 or Chem 357–358 and 251.
Lec, T R 10:10; lab, T R 11:15–1:10. B. A. Lewis.
An introduction to the chemistry of the major classes of natural and man-made fibers, including their structure, properties, and reactions. Laboratory work will include the qualitative identification of textile fibers and consideration of chemical damage to fabrics, finishes, and dyes.

438 Apparel Textiles Fall. 3 credits. S-U grades optional. Prerequisites: DEA 235, 264, or permission of instructor.
M W 2:30–4:25. V. White.
A study of the interrelationships of aesthetics, fashion and function, and other trade-offs of concern to the consumer. Consideration of the use of standards, specifications, and other means of communication at consumer, government, industry interfaces. Individual or team projects. Seminars and lectures with required readings. Lab experiences will include evaluation of articles bearing attached care labels.

439 Textile Materials for Biomedical Use Fall. 3 credits. S-U grades optional for non–DEA majors. Prerequisites: DEA 135, 235, or permission of instructor.
M 8–9:55, W 8. C. C. Chu.
Focuses on chemical and physical properties of textiles and the performance of textile materials (including structures for general hospital use and internal or external body use) clinically and in the laboratory. Typical materials include sutures, surgical dressings, elastic stockings, surgical apparel, and prosthetic materials. The impact of governmental regulations also will be examined.

445 Apparel Design IV: Theory of Functional Clothing Fall. 3 credits. Prerequisites: DEA 367 and 366.
M W 10:10–12:05. S. Watkins.
Application of theories of physical science to problems in clothing design. Problems require the student to relate three aspects of apparel design: needs and functions of the human body, structural properties of materials, and apparel forms. Information gained from study and testing of textiles and garment forms is applied to the problems of movement, warmth, impact protection in active sports equipment, and other topics related to comfort and function of clothing.

455 Psychology of the Near Environment Spring. 3 credits. Prerequisites: DEA 150, Psych 101, and either Psych 128, HDFS 115, or an equivalent; recommended: a statistics course.
M W F 10:10. E. Ostrander.
An exploration of the interaction of human beings and the immediate nonsocial environment. Interaction is considered in terms of basic psychological processes, including perception, learning, and motivation. Applications of psychological principles are made to consumer products such as clothing and appliances and the settings in which we live, work, and play.

465 Apparel Design V: Product Development and Presentation Spring. 3 credits. Prerequisites: DEA 117 and 367 or permission of instructor; recommended: DEA 102, 430, 445, Econ 102, CEH 233.
M W 1:25–4:25. A. Racine.
Through studio problems students examine the influence of manufacturing technology and cost on the designer. Projects are developed to various stages, from sketch to finished prototype. Minimum cost of materials, $50.

499 Design IV Fall or spring. 1–8 credits. (A 4-credit senior project is required for the DEA Option Ia major. Credits may be taken in 1 or 2 semesters. Students may elect additional credits in DEA 499, up to a total of 8 credits.) Prerequisite: DEA 301–302.
T R 8–11. S. Mensch, C. Williams, and department faculty.
A senior thesis (essentially a problem-solving experience): the problem area is selected by the student and approved by the department faculty. Most projects will be within product design or interior design. However, other interests may be pursued if the department approves the proposal and if the student can find a DEA instructor who will be responsible for the program. Minimum cost of materials, $60.

600 Special Problems for Graduate Students Fall or spring. Credit to be arranged. S-U grades optional.
Hours to be arranged. Department faculty.
Independent, advanced work by graduate students recommended by their chairmen and approved by the head of the department and instructor.

[620 Instrumental Analysis Fall. 2 credits. Prerequisite: organic chemistry. Not offered 1979–80.
B. A. Lewis.
An introduction to the theoretical and practical aspects of instrumentation, including spectroscopy, chromatography, electrophoresis, and other selected techniques.]

621 Textile Fiber Evaluation by Modern Analytical Techniques Spring. 3 credits. S-U grades optional. Prerequisites: DEA 335 or 436 or permission of instructor. Offered alternate years.
M W F 11:15. S. K. Obendorf.
Study of modern analytical methods, including electron spectroscopy, scanning and transmission electron microscopy, X-ray analysis, microprobes, X-ray diffraction, laser Raman spectroscopy, electron spin resonance. Evaluation of the application of these techniques in textile and polymer science. Laboratory facilities on campus will be visited for demonstrations of the instruments.

630 Physical Science in the Home Fall. 2 or 3 credits. S-U grades optional. Prerequisite: college chemistry. 3 credits require laboratory attendance. Consult instructor before registering.
Lec, T R 9:05; lab, W 2:30–4:25. M. Purchase.
Applied physical science for professionals working with consumers and home appliances. Energy conservation is considered, selected principles from physics are applied to household equipment, and the chemistry of cleaning supplies and cleaning processes is studied.

[635 Special Topics in Textiles Spring. 3 credits. Prerequisite: DEA 235 or permission of instructor. Not offered 1979–80.
An in-depth study of one or more selected topics such as comfort, formed fabrics, flammability. Relationships of fabric properties and end-use performance as well as test method development will be studied in the laboratory.]

[636 Advanced Textile Chemistry Spring. 4 credits. Prerequisite: DEA 436. Offered in alternate years. Not offered 1979–80.
B. A. Lewis.
The chemistry and physiochemical properties of natural and synthetic rubbers, polyurethanes and other elastomeric materials, high-temperature polymers, and inorganic materials used as textile fibers and the relationship between their chemistry and functional properties as textile materials. Other topics will include polymerization processes, textile finishing processes, dyes and dyeing, and degradation of textile materials under environmental conditions.]

637 Textile Seminar Fall or spring. 1 credit. S-U grades only. Required every semester of all graduate students in textiles.
T 4:30–5:45. V. White.
Discussion of research in progress and other textile topics of interest by faculty, students, and invited guest speakers.

639 Mechanics of Fibrous Structures Fall. 3 credits. Prerequisites: DEA 235 or equivalent or permission of instructor; corequisite: DEA 335.
Hours to be arranged. R. Barker.
A study of the pioneering research in the mechanics of textile structures: creep phenomena and the dynamic properties of fibers and yarns, idealized yarn and fabric models and their relationship to research data, special topics in the deformation of yarns and fabrics in tensile, shear, and compression stress, fabric bending and buckling, and the mechanical behavior of nonwoven textile materials.

650 Person-Activity-Environment Relationships Spring. 3 credits. Recommended: DEA 350, 455. Consult instructor before registering.
T R 9:05. G. Sloan.
Application of human factor constructs, data, and problem-solving strategies to near environment problems. Human requirements, capabilities, and limitations are studied with reference to design and organization of consumer products, interior spaces, and work. Literature concerns ergonomic or human-factors data and the description and measurement of work and other activities.

653 Nonverbal Communication: The Role of Objects and Space in Everyday Life Spring. 3 credits. Limited to 20. Prerequisites: introductory psychology or sociology and permission of instructor for undergraduates.
T R 10:10–11:30. F. Becker.
Starting from the premise that the psychologist's first task is to discover the problems hidden in the familiar, the course will focus on the ways people relate to and use objects and space as symbols affecting group and interpersonal processes in their everyday lives.

655 Social Psychology of the Near Environment Fall. 3 credits. Prerequisites: elementary psychology and DEA 250 or 350 or 455, or permission of instructor.
M W F 11:15. E. Ostrander.
The impact of the near environment on our behavior as social beings. Ways our environment facilitates or hinders effective functioning, individually or in groups, considered in terms of sociopsychological theory. Frameworks developed for analyzing our social behavior in varied settings. Methodological problems considered.

659 Topics in Human Environments Fall or spring. 1 credit. S-U grades only. Expected every semester of graduate students majoring and minoring in environmental analysis – human-environment relations.
R 12:20. DEA faculty.
Seminar on current issues and content in the field of person-environment relations. Discussion by faculty, students, and invited guests.

660 Environmental Psychology: Perspectives and Methods Fall. 1 credit. Permission of instructor required.
Hours to be arranged. F. Becker.
Course focuses on the relationships between people and their environment and the uses of evaluative research in the design process. Graduate students should register for DEA 250 concurrently with 660.

899 Master's Thesis and Research Fall or spring. Credit to be arranged. S-U grades optional. Registration with permission of the chairman of the graduate committee and the instructor.
Hours to be arranged. Department graduate faculty.

Human Development and Family Studies

P. Schoggen, chairman; J. Condry, Jr., graduate faculty representative; M. Basseches, H. T. M. Bayer, W. L. Brittain, U. Bronfenbrenner, M. Cochran, J. Doris, G. Elder, H. Feldman, S. Hamilton, A. Hammerman, J. Harding, B. Koslowski, L. C. Lee, B. Lust, G. Marmor, G. McCord, P. Moen, M. Potts, H. N. Ricciuti, B. L. Richardson, R. Savin-Williams, R. Silverstein, G. Suci, M. Whitham, P. Ziegler

111 Observation Fall or spring. 3 credits. Not open to first-semester freshmen.
M W F 12:20. Staff.
Provides opportunities to observe people and the settings in which they behave in order to (a) develop observational skills, (b) increase understanding of behavior and its development, and (c) acquaint students with basic methodological concepts underlying the scientific study of behavioral development. Following an orientation period, students observe in field settings. Discussion groups accompany the observation experience.

115 Human Development: Infancy and Childhood Fall. 3 credits.
M W F 11:15. G. Marmor.
Provides a systematic analysis of the forces affecting human development from infancy through childhood. Attention is focused on the interplay of biological factors, interpersonal relationships, social structure, and cultural values in changing behavior and shaping the individual. Special emphasis is given to the social implications of existing knowledge.

116 Human Development: Adolescence and Youth Spring. 4 credits. S-U grades optional.
Lec, M F 1:25, section W 1:25. M. Basseches and R. Savin-Williams.
Provides a broad overview of theories, issues, and research in the study of human development from early adolescence to early adulthood (youth). Attention is focused on the interplay of biological factors, interpersonal relationships, social structure, and cultural values in shaping the individual's development. Familial, peer group, educational, and work contexts for development are discussed.

[141 Introduction to Expressive Materials Spring. 3 credits. Limited to 18 freshmen and sophomore students. Not offered 1979–80.
T R 2:30–4:25. W. L. Brittain.
Designed to explore the means and materials suitable for creative expression for children of different ages, as well as for adults. Students are expected to acquire competence in evaluating and utilizing various media and in understanding the creative process. Experimentation in paint, clay, chalk, crayon, paper, wire, plaster, wood, and other materials.]

150 The Family in Modern Society Fall. 3 credits. Limited to freshmen and sophomores except by permission of instructor.
M W F 1:25. B. Richardson.
Contemporary family roles and functions are considered as they appear in United States history, as they change over the life cycle, and as they are influenced by the locales in which families live and the social forces that impinge on them.

212 Early Adolescence Spring. 3 credits. S-U grades optional. Prerequisite: HDFS 116 plus one course in biology strongly recommended.
T R 12:20–1:35. R. Savin-Williams.
Examines the period of the life-cycle during which the biological changes of pubescence occur. The impact of these biological changes on individual behaviors, interpersonal relations with peers and family, the relationship of the individual to society, and individual psychological development in general are explored.

218 From Adolescence to Adulthood: Developmental Issues Fall. 3 credits. S-U grades optional. Prerequisite: HDFS 116.
T R 10:10–11:25. M. Basseches.
Explores effects on individual and society when many people well beyond puberty are not yet granted full adult social status or do not assume typical adult roles and responsibilities (for example, students, transients, people experimenting with alternative life-styles). Considers both the unique developmental potentials and the stresses of youth associated with questioning of what it *means* and what it *takes* to become a full member of adult society. Intimacy, vocational choice, life-style choice, religious and political commitment, moral judgment, intellectual functioning and orientation, self-concept, and authority and dependence relations will be treated as developmental and stressful issues of this period, with several of these examined in depth.

242 Participation with Groups of Children in the Early Years Fall or spring. 3–4 credits. S-U grades optional. Prerequisites: HDFS 111 and 115. Limited to a maximum of 25 per section. Course limit depends upon the availability of placements and of supervision.
Lec, M W 1:25–2:15 plus a half-day of field study per week for three credits, and two half-days of field study per week for four credits. Staff.
A field-based course structured to integrate practicum, lectures, discussions, readings, and term projects to aid the student in gaining a better knowledge and understanding of children between the ages of two and six. Practicum settings include nursery schools, day care centers, Head Start centers, and Special Children's Center. Students registered for three credits should save one morning (9–12 a.m.) or one afternoon (1–4 p.m.) per week for field settings. Those registered for 4 credits should save two mornings or afternoons. Mornings are preferred.

243 Participation with Groups of Children in the Middle Years Spring. 3–4 credits. S-U grades optional. Course limit depends upon the availability of placements and of supervision. Prerequisites: HDFS 111 and 115. Limited to 15.
T 8–9:55. Staff.
A field-based course structured to integrate practicum, lectures, discussions, readings, and other assignments to aid the student in gaining a better knowledge and understanding of children between the ages of seven and twelve. Practicum settings include elementary schools and youth bureau and after-school programs. Students registered for three credits should save one of the following times for participation (students registered for four credits should save two): 9–12 or 1–4 for a school experience or 2:30–5:30 for an after-school experience.

253 The Family (also Soc 243) Fall. 3 credits. (4-credit option available). Human ecology students must register for HDFS 253.
T R 10:10 and 1 hour to be arranged. B. C. Rosen.
The structure and function of the family both in the West and cross-culturally. Specific areas examined include sex roles, socialization, mate selection, sex and sexual controls, internal familial processes, disorganization, and social change.

270 Processes of Adaptation and Atypical Development Spring. 3 credits. Prerequisites: HDFS 115, Psych 101, or Educ 110.
M W F 9:05. Staff.
An introduction to atypical development through the study of environmental sources of stress on the growing person. Attention is given to the family, the neighborhood, the peer group, and the school in order to understand atypical adaptations and development.

300 Special Studies for Undergraduates Fall or spring. Credit to be arranged.
Hours to be arranged. Department faculty.
Special arrangement for course work to establish equivalency for courses not transferred from a previous major or institution. Students prepare a multicopy description of the study they wish to undertake on forms available from the Counseling Office. The form, signed by both the instructor directing the study and the head of the department, is filed at course registration or during the change-of-registration period.

302 Family and Community Health Fall or spring. 3 credits.
T R 8; plus sec 1, T 9:05 or sec 2, R 9:05. Staff.
This introduction to health science focuses on research and knowledge related to personal, family, and community responsibility for healthful living, disease prevention, and the environmental problems that affect the quality of health throughout the life cycle. Substantive material includes physical, mental, and emotional functioning, chemical alteration of behavior, family health, personal health care, and health in society. Discussion sections deal with decision making and application of theory in health science.

307 Collective Behavior and Social Movements (also Soc 307) Fall. 3–4 credits. Prerequisite: a course in sociology or another social science. Human ecology students must register for HDFS 307.
T R 2:30–4. G. Elder.
An inquiry into social behavior that breaks with institutionalized or conventional forms, such as acting crowds, riots, social movements, and revolution. Analysis of antecedent conditions, emergent forms, processes, and consequences. Historical and contemporary studies will be covered.

313 Problematic Behavior in Adolescence Fall. 3 credits. Prerequisites: HDFS 116 and one other course on adolescence. Offered every other year.
M W F 1:25. R. Savin-Williams.
Focuses primarily on juvenile delinquency and other problems of adolescence such as drug abuse, alcohol, pregnancy, suicide, and other social and personal issues. Students interested in adding related field experience should register concurrently for HDFS 410.

315 Human Sexuality: A Psychosocial Perspective Fall. 3 credits. Prerequisite: introductory course in HDFS, psychology, or sociology, or equivalent social science course.
Fall: lec, T 12:20–1:35; section R 12:20–1:35 or 2:30–3:45; H. Feldman. Spring: hours to be arranged; staff.
The aim of this course is to delineate the major psychological and sociological components of human sexual attitudes and behavior. Two central themes will be addressed: the development of sexual orientation over the life cycle and the evolution of sexual norms and customs within changing social systems. An underlying issue will be the role of moral assumptions and contemporary ethics in generating research and theory on human sexuality in the social sciences. Materials will be drawn from interdisciplinary sources including biology, history, and anthropology.

333 Cognitive Processes in Development Spring. 3 credits. Prerequisite: HDFS 115 or equivalent.
M W F 11:15. G. Suci.
A survey of theories and problems in the development of selected cognitive processes: attention, perception, mediation processes, and language.

334 Piaget's Theory of Cognitive Development Spring. 4 credits. S-U grades optional. Offered every other year.
Lec, M W F 1:25–2:15. B. Lust.
This introduction to Piaget's theory of intellectual development is open to undergraduate and graduate students. The course is intended to provide students with a basic and critical knowledge of Piaget's theory of intelligence. The course will review Genevan research on object permanence, the development of logic, number, classification, and seriation, as well as formal operations of scientific thinking. Research on representation, through mental imagery and language, for example, will also be discussed, as will current attempts to extend Piagetian theory to educational practice. Related research in these areas also will be considered.

338 The Development of Creative Thinking Spring. 3 credits. Prerequisites: HDFS 115, Psych 101, or Educ 110. Not to be taken concurrently with HDFS 141.
M W F 9:05–10:10. W. L. Brittain.
A study of theories of creativity and a review of the research on creative behavior. Emphasis is on the conditions and antecedents of creative thinking.

342 Models and Settings in Programs for Children. Fall. 3 credits. Prerequisite: HDFS 115.
T R 12:20–1:35. Staff.
Surveys a wide range of programs for children. Basic theories and beliefs will be linked to programs they have helped create (i.e., Montessori, Piaget, Berieter, Engleman, Weikart, Caldwell).

344 Infant Behavior and Development
Fall. 3 credits. Prerequisite: HDFS 115 or equivalent.
T R 12:20–1:35.
Nature and determinants of major developmental changes in infant behavior from birth to two years. Special attention directed to role of major environmental influences on perceptual-cognitive and social-emotional development, and to recent attempts to modify infants' experiences in the interest of facilitating psychological development.

346 The Role and Meaning of Play
Spring. 2 credits. Prerequisites: HDFS 111 and 115. Limited to 35.
W 7–9 p.m. Staff.
The role and meaning of play in the lives of children ages two through seven. Seminar discussions will integrate the theoretical and empirical literature on play with practical application in a variety of early childhood settings. Special emphasis given to ways to facilitate play experiences through the structuring of the environment and the use of materials and equipment. Students will explore and construct early childhood materials in frequent workshops.

347 Human Growth and Development: Biological and Social Psychological Considerations (also NS 347) Spring. 3 credits. Prerequisites: Bio S 101 or 109 or equivalent; HDFS 115 or Psych 101; and NS 115 or equivalent.
M W F 1:25. J. Haas, H. Ricciuti.
A review of major patterns of physical growth from the fetal period through adolescence, with consideration given to biological and socioenvironmental determinants of growth, as well as to physical and psychological consequences of variations in growth patterns. Normal patterns of growth will be examined, followed by an analysis of major sources of variations in growth (normal and atypical).

348 Specialized Participation in Preschool Settings Spring. 3 credits. Prerequisites: HDFS 242 and permission of instructor. Limited to 10 students concurrently taking HDFS 346.
Time to be arranged. Staff.
An advanced supervised fieldwork experience at the Cornell Nursery School, consisting of two half-days plus an hour staff meeting per week. Designed for students who have mastered basic guidance skills with preschool children. The focus will be on developing more refined teaching techniques with learning materials.

352 Contemporary Family Forms in the United States Spring. 3 credits. S-U grades optional.
R 2–4:25 plus case study. H. Feldman.
Variations in family formation, organization, and functioning will be investigated with an emphasis on research findings about each of the family types. Family forms will range from the rural communal family to the more contemporary urban. The functions of each family form will be considered as they apply to the individual, the family, and to the society.

354 The Family in Cross-cultural Perspective
Fall. 3 credits. S-U grades optional. Prerequisites: HDFS 115 or 116, Psych 101 or Educ 110, and HDFS 150 or R Soc 100, or equivalent.
M W F 10:10. P. Moen.
The sociological study of the family, with particular reference to the relationships between the family and society and between the family and its individual members. Extensive use will be made of cross-cultural and comparative materials.

358 Theories of Adult Interpersonal Relationships Fall. 3 credits. S-U grades optional.
R 2–4:25 plus case study. H. Feldman.
Selective theories of the basic disciplines in social psychology, sociology, and psychology will be reviewed and their pertinence to understanding of adulthood examined. Students will generate hypotheses about these theories and test one of them through either a library or empirical paper. A notebook or journal will be kept to interrelate the concepts and to suggest practical justifications.

[360 Personality Development in Childhood
Spring. 3 credits. Prerequisites: HDFS 115 or Psych 101, plus one other course in HDFS or psychology. Not offered 1979–80.
M W F 10:10. L. C. Lee.
Study of relevant theoretical approaches to and empirical findings regarding the development of the child's personality. The influence of parents and other environmental factors on the child will be examined. Topics to be covered will be attachment, autonomy, identification, moral development, and social behavior.]

361 The Development of Social Behavior Spring. 3 credits. Limited to 100. Prerequisite: HDFS 115 or Psych 128.
M W F 10:10. J. Condry.
Issues in the development of social behavior are viewed from the perspective of theory and research. An attempt is made to apply our understanding of social behavior to education, childbearing, and group behavior. Likely topics include bases of social behavior in early childhood, the role of peers, the development of aggressive behavior, the development and functioning of attitude and value systems, conformity and deviation, and the function and limits of experimental research in the study of social development.

365 The Study of Lives Fall. 3 credits.
Prerequisites: HDFS 115, 116, 270 or equivalent.
M W F 9:05. J. Harding.
The study of personality development through the analysis of individual life histories. Biological, sociological, and psychodynamic influences will be given approximately equal emphasis. There will be extensive discussion of the development of motives, decision making, and personal relationships. The term paper will be a psychological analysis of a specific individual based on a published biography or autobiography.

371 Behavioral Disorders of Childhood Spring. 3 credits. Prerequisites: Psych 101 or Educ 110, and a course in personality development (such as HDFS 270 or an equivalent).
M W F 12:20. Staff.
Considers major functional disorders of childhood, ranging from transient and adjustment reactions through the psychoses, with reference to theories of development and related approaches to prevention and remediation in one-to-one family and institutional settings.

[372 Intellectual Deviations in Development Fall. 3 credits. Prerequisites: HDFS 115 and a personality course. Not offered 1979–80.
M W F 12:20. Staff.
Major forms of organic and familial retardation, perceptual and motor handicaps, and learning disabilities are considered with reference to problems of development, prevention, and remediation.]

380 Aging in America Spring. 2 credits.
Prerequisite: one social science course.
M W 9:05. J. Harding.
This course is a general introduction to social gerontology in America. Some attention is given to biological and psychological aspects of aging and considerable attention is paid to such problems as occupational retirement, bereavement, and the decline of physical health. The course also surveys social planning for the elderly and the provision of special medical, economic, and social services.

397 Experimental Child Psychology Fall. 4 credits. Prerequisites: one course in statistics and permission of instructor.
T R 10:10–11:40, plus additional hours for laboratory work. L. C. Lee.
A study of experimental methodology in research with children. Includes lectures, discussions, and practicum experiences covering general experimental design, statistics, and styles and strategies of working with children. The course is intended primarily for students interested in entering graduate programs involving further research training.

398 Junior Honors Seminar Spring. 3 credits. Permission of the director of the Honors Program required for registration. Enrollment limited to students in the honors program.
Hours to be arranged. Staff.
The seminar will be devoted to readings, reports, and discussion of selected major issues in human development and family studies.

400–401–402–403 Special Studies for Undergraduates Fall or spring. Credits to be arranged. S-U grades optional.
Hours to be arranged. Department faculty.
For advanced, independent study by an individual student or for study on an experimental basis with a group of students in a field of HDFS not otherwise provided through course work in the department or elsewhere at the University. Students prepare a multicopy description of the study they wish to undertake on forms available from the Counseling Office. This form must be signed by the instructor directing the study and the department chairman and filed at course registration or within the change-of-registration period after registration. In order to ensure review before the close of the course registration or change-of-registration period, early submission of the Special Studies Form to the department chairman is necessary. Students, in consultation with their supervisor, should register for one of the following subdivisions of independent study:

400 Directed Readings For study that predominantly involves library research and independent study.

401 Empirical Research For study that predominantly involves data collection and analysis or laboratory or studio projects.

402 Supervised Fieldwork For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

403 Teaching Apprenticeship For study that includes assisting faculty with instruction.

410 Field Experience in Adolescent Development: The Individual in Community Settings Fall.

411 Field Experience in Adolescent Development: Social Policy Toward Youth Spring.

3–9 credits. S-U grades optional. Prerequisite or corequisite: HDFS 313, a skills training course or equivalent experience, and permission of instructor. Enrollment limited by availability of fieldwork placements.
Lec, M 7:30 p.m., plus field study. M. Whitham.
Designed to give students experience in various settings (such as social, legal, educational, and helping agencies) working with typical and atypical adolescents. 410 focuses on the individual in community settings while 411 examines social policy toward youth.

414 Policies and Programs for Adolescents
Spring. 3 credits. S-U grades optional. Prerequisites: HDFS 116 and HDFS 212 or HDFS 218, or permission of the instructor. Offered every other year.
W F 2:30–3:20. S. Hamilton.
Plans and practices intended to foster adolescent

development are examined in the light of needs identified by theory and research. The key question is how societal and governmental institutions support or hinder the transition of adolescence to adulthood. Current practices of schools, youth-serving agencies, and workplaces are contrasted with proposals and pilot programs for increasing opportunities for adolescents to take responsible roles in their communities. The design, implementation, and evaluation of programs for this purpose are explored.

[418 Work and Human Development Fall. 3 credits. S-U grades optional. Prerequisites: background in adolescent and adult development or work-related courses, and permission of instructor. Offered every other year. Not offered 1979–80.
M. Basseches.
Explores the usefulness of developmental theory as a basis for enhancing understanding of the nature and meaning of work for both adolescents and adults. In exploring the work place as a context for human development, the course addresses itself to problems of vocational training and counseling, of workplace reorganization, and of improving the quality of working life.]

431 Learning in Children Fall. 3 credits.
W 12:20–2:15; laboratory and field experience to be individually arranged. M. Potts.
Consideration of the theoretical and research literature in processes of learning. Includes the interrelations of learning and development, and learning and intelligence; examines theories and models of learning, as well as variables that affect the learning process. Application is made to the assessment and facilitation of specific learning processes through laboratory and field work.

432 Intellectual Development and Education Spring. 3 credits.
T R 2:30. M. Potts.
This course will define basic cognitive processes that underlie education (e.g., linguistic processes which underlie language comprehension and production; numerical processes which underlie mathematics; reasoning processes which underlie logical inference, classification, and seriation); and will review basic and current research on the development and learning of these processes in young children. In addition, the course will consider the implications of theories of development to various approaches to education. (For example, the relevance of Piagetian developmental theory to standard and alternative education models.)

[436 Language Development (also Psych 436) Spring. 3 credits. Prerequisites: at least one course in cognitive psychology, cognitive development, or linguistics. Course in linguistics strongly recommended. Not offered 1979–80.
T R 10:10–12:05. B. Lust and S. Shattuck-Hufnagel.
The course will survey basic literature in language development. Major theoretical positions in the field will be considered in the light of studies in first language acquisition of phonology, syntax, and semantics, from infancy on. Attention will be given to models of sentence processing in perception, production, and memory. The acquisition of communication systems in nonhuman species such as chimpanzees and birds, and the fundamental issue of relationships between language and cognition will also be discussed.]

437 Creative Expression and Child Growth Fall. 4 credits. Limited to 25. Saturday morning should be free in order to provide time for participation with children.
T R 10:10–11:30. W. L. Brittain.
Aimed at an appreciation and understanding of the creative process in art, music, dance, and drama in relation to the development of children.

451 Innovative Programs of Parent Intervention and Community Action Spring. 3 credits. Permission of the instructor required before preregistration. Limited to 10.
T 2:30–4:25. Additional laboratory and field experiences to be individually arranged. H. Bayer.
Emphasis on the theoretical bases and the empirical consequences of programs intended to change styles of parental behavior, whether by manipulation of individual action or of societal alternatives. Consideration of parent intervention and social action.

456 Families and Social Policy Spring. 3 credits. S-U grades optional. Prerequisite: one course in the area of the family or in sociology.
T R 10:10–11:40. P. Moen.
An examination of the intended consequences for families of governmental policies using series of case studies in areas such as social welfare, day care, and employment. The policy implications of changes in the structure and composition of families are also considered.

470 Field Experience in Atypical Development Fall. 1–3 credits. S-U grades only. Open only to students concurrently registered in HDFS 371 or 372.
T 2:30–4. Staff.

490 Historical Roots of Modern Psychology Spring. 4 credits. Prerequisites: 3 courses in the behavioral sciences or consent of instructor.
M W F 12:20–1:10. P. Carlson.
A survey of the major historical antecedents of contemporary psychology, including the philosophical tradition (from Aristotle through the Enlightenment), the medical-therapeutic tradition, and the rise of modern science and experimental psychology. Scholars from throughout the University will give presentations in their own specialties. Students will do concentrated work in their own areas of interest. Those who are registered in a college offering this course must register for the course through their own college.

499 Senior Honors Thesis Fall or spring. Credit to be arranged. S-U grades only. Registration with permission of thesis adviser and director of honors program.
Department faculty.

Topics Courses

415 Topics in Adolescent Development

435 Topics in Cognitive Development

445 Topics in Early Childhood Education and Development

455 Topics in Family Studies

465 Topics in Social and Personality Development

475 Topics in Atypical Development

485 Topics in the Ecology of Human Development

Fall or spring. 2–4 credits. Prerequisites and enrollment limits vary with topic being considered in any particular term. Permission of the instructor required.
Days and hours to be arranged. Department faculty.
This series of courses provides an opportunity for advanced undergraduates to explore an issue, theme, or body of research in the areas of departmental concentration. Topics vary each time the course is offered. Descriptions are available at the time of course registration. Although the courses are usually taught as seminars, a subject may occasionally lend itself to lecture, practicum, or other format.

The Graduate Program

Human development and family studies graduate courses are open to undergraduates only with instructor's permission.

The following courses usually will be taught annually:

601 Research Design and Methodology Fall. 3 credits.
T R 10:10–12:05. B. Koslowski.
Seminar will consist of three components: (1) discussion of representative literature on problems of research design, methodology, and data collection; (2) analysis of methodological issues involved in empirical studies employing different kinds of research designs and methods, both in laboratory and field settings; and (3) a practicum component in which students will formulate research designs for their own problems, to be evaluated and criticized at each stage of development and pretesting.

[602 Research Design and Data Analysis Fall. 3 credits. Prerequisite: HDFS 601. Not offered 1979–80.
Hours to be arranged. Department faculty.
Students will carry out research projects designed in HDFS 601. While working with individual faculty members on these projects, the seminar will meet as a group to review and criticize progress reports of each other's research. The seminar also will discuss, through appropriate literature, problems involved in data analysis, interpretation, explanation, causal imputation, and writing research findings in publishable form.]

603 Development in Context Fall. 3 credits.
T R 2:30–4:25. U. Bronfenbrenner.
This seminar examines issues of theory, substance, and research design related to human development in the actual contexts in which people live. Emphasis is placed on the interaction of processes (biological, psychological, and social) and social systems in the course of development in a variety of settings. The seminar is recommended for graduate students entering the field.

700–706 Special Studies for Graduate Students Fall or spring. Credits and hours to be arranged. S-U grades at discretion of instructor.
Department faculty.
Independent, advanced work by graduate students recommended by their special committee chairman with approval of the instructor.

700 Directed Readings For study that predominantly involves library research and independent study.

701 Empirical Research For study that predominantly involves collection and analysis of research data.

702 Practicum For study that predominantly involves field experience in community settings.

703 Teaching Assistantship For students assisting faculty with instruction. Does not apply to work for which students receive financial compensation.

704 Research Assistantship For students assisting faculty with research. Does not apply to work for which students receive financial compensation.

705 Extension Assistantship For students assisting faculty with extension activities. Does not apply to work for which students receive financial compensation.

706 Supervised Teaching For advanced students who assume major responsibility for teaching a course. Supervision by a faculty member is required.

899 Master's Thesis and Research Fall or spring. Credit to be arranged. S-U grades only. Registration with permission of thesis adviser.
Department graduate faculty.

999 Doctoral Thesis and Research Fall or spring. Credit to be arranged. S-U grades only. Registration with permission of thesis adviser.
Department graduate faculty.

These courses will be taught at least every other year:

617 Adolescence Spring. 3 credits.
W 7:30 p.m. M. Basseches.
Current issues in the theoretical and empirical literature on adolescent development.

631 Cognitive Development Spring. 3 credits.
T R 10:10–12:05. B. Koslowski.
Overview of current research and theoretical issues in cognitive development with special emphasis on the sorts of areas relevant to real world (as opposed to laboratory) behavior and on the sorts of cognitive phenomena that can be detected by human observers (rather than phenomena that can be detected only with the aid of technical equipment).

640 Infancy Spring. 3 credits.
R 10:10–12:35. H. Ricciuti.
Critical review of major issues of contemporary concern in the field of infant behavior and development, based on readings of selected research papers and review articles. The overall intent is to develop an analytic understanding of where the field stands at present with respect to various topical issues and to identify directions for future research.

641 Early Childhood Education Fall. 3 credits.
M 12:20–2:15. M. Potts.
Survey of major issues in the theoretical and research literature of early childhood education.

650 Family Spring. 3 credits.
T R 12:20–2:15. Staff.
The uses of sociological theories and research in the study of the family, with particular reference to the relationship between the family and society and between the family and its individual members.

[660 Personality and Socialization Spring. 3 credits. Not offered 1979–80.
W 2:30–4:25. J. Condry.
Major issues in personality development and socialization, with special emphasis on theoretical models and empirical issues.]

670 Atypical Development Fall. 3 credits.
W 1:25–4:25. Staff.
Overview of current theories and empirical research on functional and organic disorders in childhood.

691 Research Practicum in the Ecology of Human Development Fall and spring. 3–4 credits.
Hours to be arranged. U. Bronfenbrenner, M. Cochran, W. Cross.
Students have the opportunity to participate in various phases of an ongoing five-nation study on the impact of family support systems on family function and the development of the child. Open to graduate students and upperclass students by permission of the instructor.

Topical Seminars

Seminars, offered irregularly, with changing topics and instructors. Content, times, credit, and instructors to be announced. Seminars offer concentrated study of specific theoretical and research issues.

618 Seminar in Adolescence Topics include peer relations, parent-teen relationships, self-esteem identity formation, work, and moral development.

633 Seminar on Language Topics include acquisition of meaning in infancy, precursors of language in early infancy, and language development in bilingual children.

635 Seminar in Cognitive Development Topics include early attention, perception, memory, and communication. Assessment and intervention in relation to these processes will be considered when possible.

645 Seminar on Infancy Topics covered in depth include the role of emotions in early development, infant stimulation and early experience, and the assessment of infant developmental competencies.

646 Seminar in Early Childhood Education Topics include analysis of models and settings, design of assessment techniques, program evaluation, and early childhood in a cross-cultural context.

655 Seminar in Family Studies Topics include the marital dyad, the family in poverty, and the single-parent family.

665 Seminar in Personality and Social Development Topics include socialization in infancy, peer relations, and sex-role development.

675 Seminar in Atypical Development Topics include learning disabilities, therapeutic interventions in atypical development, child abuse and maltreatment, and family factors in the etiology of functional disorders.

685 Seminar in Human Development and Family Studies Topics include development of self-concept, sex-role identity, observational methods, and play interviews in developmental research.

690 Seminar on Ecology of Human Development Topics include the institutional setting as a determinant of behavior, the poor family, and the identification and measurement of ecological variables.

Human Service Studies

(Formerly **Community Service Education**)

I. Lazar, chairman; H. Y. Nelson, graduate faculty representative; J. Allen, R. J. Babcock, D. J. Barr, S. Blackwell, E. Conway, A. Davey, D. Deshler, C. Farris, J. L. Ford, W. W. Horne, C. C. McClintock, M. Minot, B. J. Mueller, L. A. Noble, W. Paine, C. Reed, R. Rist, C. Shapiro, L. Street, B. L. Yerka, M. Zober.

202 Structure of Community Services Fall or spring. 3 credits.
M W F 10:10. D. Barr and staff.
A lecture and discussion course designed as an introduction to the community base of services. The presence or absence of educational, social, and planning services, as well as their place and performance, are examined in the context of theoretical and empirical community dimensions. Examples of such dimensions include community complexity, differentiation, modernity, ethnicity, and community role.

203 Groups and Organizations Fall or spring. 3 credits. Should be taken after or concurrently with HSS 202.
M W F 9:05. Staff.
A basic course in the social psychology of small groups and human service organizations. Study of group processes will include self perception and interpersonal perception of roles, norms, communication, power, and leadership. Students will apply what has been learned about small groups to the study of issues in human service organizations (for example, goals, evaluation, structure, technology, relationships between organizations and clients, environment, and change).

240 What is Teaching? Fall or spring. 1 credit.
W 3:35. M. Minot.
This course is designed to provide students with a wholistic approach to the examination of the multiple roles of a teacher and an opportunity to anticipate their ability to adapt to and carry out the roles of a teacher. Each student will work with a teacher in a university or community setting. The student will observe or assist the teacher in carrying out a variety of responsibilities. The seminar will develop ideas gained from the mentor relationship.

246 Ecological Determinants of Behavior Fall. 3 credits. Preference given to HSS Option II students. Prerequisites: introductory sociology and psychology, and permission of instructor.
M W 2:30–3:45. C. Shapiro.
Biological, psychological, and social determinants of human behavior presented from the perspective of social work practice. Social role analysis, with emphasis on coping, mastery, and conflict resolution. A life-span perspective on individual and family developmental tasks, with emphasis on human diversity.

292 Research Design and Analysis Fall or spring. 3 credits. Prerequisite: basic course in psychology or sociology. Limited to 50.
T R 2:30–3:45. S. Blackwell, H. Nelson.
Students should develop skill in analyzing and evaluating research reports. Readings and periodic assignments and exercises focus on stating hypotheses, designing studies to test hypotheses, measuring variables, and interpreting findings. Major project is a research proposal that is critiqued before the final draft is submitted.

300 Special Studies for Undergraduates Fall or spring. Credit to be arranged.
Hours to be arranged. Department faculty.
Special arrangement for course work to establish equivalency for training in a previous major or institution. Students prepare a multicopy description of the study they wish to undertake on forms available from the Counseling Office. This form, signed by both the instructor directing the study and the head of the department, should be filed at course registration or during the change-of-registration period.

325 Health-Care Services and the Consumer Spring. 3 credits. S-U grades optional. Limited to 40 juniors and seniors.
T R 2:30–3:45. J. Ford.
Developments in the health field that affect the availability and kinds of health services. Emphasis is placed on interrelationships between institutions and agencies and the part each can play in prevention, diagnosis, and treatment of disease and disability.

330 Ecology and Epidemiology of Health Spring. 3 credits. S-U grades optional.
T R 12:20–1:35. J. Ford.
Ecological and epidemiological approaches to the problems of achieving human health within the physical, social, and mental environment. The course will introduce epidemiological methods to the student and will survey the epidemiology of specific diseases.

340 Clinical Analysis of Teaching Fall or spring. 1 credit. Priority given to HSS majors in Option I.
T 12:20–2:15 plus additional hours to be arranged.
C. Farris.
A laboratory course that provides students with theoretical frameworks for observation, analysis, and practice of various teaching behaviors and their effects on learners. Course content includes analysis of verbal and nonverbal behaviors, patterns of verbal interaction, motivational techniques and planning and teaching for cognitive, affective, and psychomotor

learning. Opportunity for observation, practice, self-evaluation, and improvement of various skills and strategies is provided in microteaching laboratories where students teach brief lessons to small groups in various community settings.

370 Social Welfare as a Social Institution Fall. 3 credits. Limited to HSS social work students or permission of instructor.
M W F 9:05. J. Allen.
A philosophical and historical introduction to social welfare services. The course reviews the social contexts from which programs and the profession of social work have evolved. It discusses the political and ideological processes through which public policy is formed and how policies are translated into social welfare programs. Basic issues in welfare are discussed in the context of present program designs, public concerns, and the interrelationships and support of services in the community.

400–401–402 Special Studies for Undergraduates Fall or spring. Credit to be arranged. S-U grades optional. Limited to HSS, interdepartmental, and independent majors.
Hours to be arranged. Department faculty.
For independent study by an individual student in advanced work in a field of HSS not otherwise provided in the department or at the University, or for study on an experimental basis, with a group of students, in advanced work not otherwise provided in the department or at the University. Students prepare a multicopy description of the study they wish to undertake on forms available from the Counseling Office. This form must be signed by the instructor directing the study and the department chairman and filed at course registration or within the change-of-registration period after registration. In order to ensure review before the close of the course registration or change-of-registration period, early submission of the Special Studies Form to the chairman is necessary. Students, in consultation with their supervisor, should register for one of the subdivisions of independent study that follow.

400 Directed Readings For study that predominantly involves campus library research and independent readings.

401 Empirical Research For study that predominantly involves data collection and analysis or laboratory or studio projects.

402 Supervised Fieldwork For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

411 Introduction to Adult Education Fall or spring. 3 credits. S-U grades optional. Limited to 60. Preference given to HSS majors.
T R 10:10–12:05. D. Deshler.
Focuses on the broad aspects of adult education, scope and history of adult education programs, philosophy and principles, perspective of the adult learner, media and methods of instruction, and program development. Opportunities will be provided for observation of adult education programs in community organizations and agencies.

412 Skills and Methods in Community Education Fall. 3 credits. S-U grades optional.
T R 2:30–4:25. C. Reed.
Opportunity for students to observe community learning activities, to learn community education methods, and to develop skill in using a variety of these methods. Includes techniques of program planning, community development, citizen participation, public affairs education, program evaluation, presentation and discussion. Observations in the Ithaca area.

[413 The Adult Learner in Microperspective Fall. 3 credits. Not offered 1979–80. Next offered 1980–81.
This research course examines a full range of adult learning activities by conducting in-depth interviews with selected adult learners. The interests, motivations, needs, and special problems of adult learners will be considered in relationship to adult learning theory. Skills in conducting interviews, analyzing qualitative data, and in presenting findings will be developed.]

414 Practicum Fall or spring. 6 credits. Section A open only to HSS Option III majors who have completed the prerequisites planned with their adviser; section B open only to Interdepartmental Option I majors. Permission of the option adviser and agency field preceptor required before registration.
Department faculty.
An opportunity for a student to assume a professional role and responsibilities under the guidance of a preceptor in a community service organization. Conferences involving the student, field preceptor, and college supervisor will be arranged in a block, scheduled throughout the semester, or completed in the summer session, depending on the nature and location of the student's fieldwork.

415 The Adult Learner in Macroperspective Fall. 3 credits.
W 7:30–10:30 p.m. D. Deshler.
Focuses on the variety of adult education programs in countries around the world. Literature on comparative adult education, international conferences on adult education, UNESCO adult education publications, and international community development will be analyzed in relationship to each student's exploration of adult education in a single country. Description of adult education in other countries will be shared by international students.

416 The Helping Relationship Fall. 3 credits. S-U grades optional.
Lec T 10:10–12:05; plus one discussion section (limited to 20 students each): sec 1, R 2:30–4:25; sec 2, R 10:10–12:05. D. Barr.
The first half of the course concentrates on theory, research, and experimental exercises in interpersonal relationships. The second half focuses on the ecological aspects of the helping relationship. The course is designed on the assumption that feelings and ideas can and should be taught together.

440 Program Planning Fall or spring. 2 credits. Teaching majors in Option I should schedule this course for the semester before HSS 441–442.
T R 8; plus a block of approximately three hours (between 9 a.m. and 3 p.m.) during the week for observations or participation in educational programs, unless the program of interest meets in the evening. M. Minot.
Students will analyze the factors that influence program planning and change and apply principles of program development to planning for a group or individuals in programs with different purposes and organizational structures. Plans should reflect a knowledge of clients, societal trends, issues in the problem area, the philosophy of the specific program and of education, the psychology of learning, and organizational structures and will be critiqued by a panel of professionals.

441 The Art of Teaching Fall; offered during the first 7 weeks of the term. 2 credits. To be taken concurrently with HSS 442 and 443. Prerequisites: HSS 340 and 440.
T R 10:10–12:05; plus additional hours arranged during the week of independent study following student teaching. E. Conway.
An orientation for the student teaching practicum. Major topics considered interrelated are: classroom atmosphere, discipline, and management; evaluation of the teaching and learning processes in relation to personal goals and unit objectives; philosophy, creativity, and teaching techniques; professionalism. Selected materials for the student teaching practicum are developed. May involve some expense for field visits.

442 Teaching Internship Fall or spring; student teaching full-time for last seven weeks of term. 6 credits. To be taken concurrently with HSS 441 and 443. Prerequisite: HSS 440.
M. Minot, coordinator, and department faculty.
Guided student teaching experience with student assigned to cooperating public schools. Student teachers are required to live in the school communities and work under the guidance of local teachers and department faculty. Cooperating schools are located in different types of communities, represent a variety of organizational structures, and have comprehensive programs. Students should indicate their intent as early as possible to facilitate communication and scheduling. Transportation and off-campus living costs need to be planned for in advance. Living arrangements are determined by the student. Costs may or may not be more than on campus depending on choices made.

443 Critical Issues in Education Fall or spring; offered during the first 7 weeks of the term. 2 credits. S-U grades optional except for HSS Option I students. Limited to 25; priority given to HSS Option I students. No students will be admitted to the class after the first session.
F 12:20–2:15. R. Babcock.
An examination of current issues in education. Analysis of historical, philosophical, social, and political factors that affect these issues.

444 Career Environment and Individual Development. Spring; offered during the second 7 weeks of the term. 2 credits. S-U grades optional. Limited to 25. No students will be admitted to the class after the first session.
F 12:20–2:15. R. Babcock.
An analysis of how work, jobs, and careers relate to and shape the behavior of individuals. Topics considered are theories of occupational choice, job satisfaction, structure of the labor force, manpower projection, and career planning. The course provides opportunities for students to examine their own vocational aspirations. Emphasis is placed on how the helping professional deals with clients or students in preparing for, adjusting to, and maintaining jobs and careers.

446 Teaching for Reading Competence: A Content-Area Approach. Fall. 2–3 credits. S-U grades optional.
T 7:30–9:30 p.m. E. Conway.
The teaching of reading through various content areas. Intended for future educators and community service professionals as well as those already working in these fields. The course will focus on (1) need for improvement in reading, (2) evaluation of reading materials, (3) teaching reading skills basic to various content areas, and (4) development of materials to be used in a setting appropriate for the student. Opportunity to use the materials in a field setting, formal or informal, may be arranged if desired. If field work is selected, the cost of transportation to the field setting will be provided by the student.

471–472 Social Work Practice I and II
Introduction to concepts and methods used in a generalist task-centered model of social work practice. Examination of the values and ethics of professional practice. Microcounseling skills are taught using role playing and video feedback. Class content is integrated with concurrent supervised fieldwork. Placements are made in social agencies in Tompkins, Tioga, Chemung, Cortland, Broome, and Steuben counties. Students are encouraged to provide their own transportation, but car pools will be arranged for those who cannot. The department reimburses transportation costs when funds are available, but students may have to pay their own expenses.

471 Social Work Practice I Fall. 9 credits. Prerequisites: introductory psychology, introductory sociology, a course in human development, grades of C+ or better in HSS 246 and 370, and permission of instructor before registration. Limited to 25 social work students.
Lec, M W 10:10–12:05; fieldwork, T R for 8 hours. Sec 1, C. Shapiro; sec 2, J. Ang.

472 Social Work Practice II Spring. 9 credits. Prerequisite: grade of B– or better in HSS 471. Limited to 25 social work students.
M W 10:10–12:05; fieldwork, T R for 8 hours. Sec 1, J. Mueller; sec 2, J. Ang.

473 Senior Seminar in Social Work Spring. 3 credits. Prerequisites: HSS 471–472 (HSS 472 may be taken concurrently), and permission of the instructor before course registration. Limited to 25; priority given to social work students.
Sec 1, M 2:30–3:45, W 2:30–3:20; sec 2, M 2:30–3:20, W 2:30–3:45. J. Mueller and staff.
Building on the junior-year practice courses, this seminar will integrate intermediate-level theory and practice content and examine value dilemmas and recurring themes in professional practice.

474 Program Development in Social Services Fall. 3 credits. Preference given to social work students. Prerequisite: permission of the instructor before course registration. Social work students should take this course concurrently with HSS 471.
M W F 2:30. M. Zober.
This seminar will be coordinated with HSS 471 (Social Work Practice I) and teach program development in the fields in which students have their placements.

475 Social Policy Spring. 3 credits. S-U grades optional. Prerequisites: HSS 370 or Govt 111 or Soc 141.
M W F 9:05. J. Allen.
An examination of the policymaking process and the significance of national policies as they affect the distribution of social services. Frameworks for analyzing social policy will be used to evaluate existing social programs and service delivery systems. Implications for change in policies at the national, state, and local levels will be discussed. Students should have field or work experience in a human service program prior to or while taking this course.

The Graduate Program

Human Service Studies graduate courses are open to undergraduates only with permission of the instructor.

600 Special Problems for Graduate Students Fall or spring. Credits to be arranged. S-U grades optional. For students recommended by their chairmen and approved by the instructor in charge for independent, advanced work.
Department faculty.

601 Introduction to Human Service Studies Fall. 3 credits.
M 7:30–10:30 p.m. C. McClintock.
The major topics dealt with include: program evaluation and evaluative research, program planning and development, and higher education in human services. Emphasis will be placed on current viewpoints and related lines of research in each area, and particularly on interrelationships among the areas.

604–605 Internship in Human Service Studies Fall, spring, or summer. 1–15 credits. S-U grades optional.
Hours to be arranged. Graduate faculty.
Internship placement in human services will be determined by availability and each student's academic and professional goals. Opportunities are available in public and private human service organizations at the national, state, and local level in positions consistent with student needs and desires. The duration of an internship is negotiated by the student and the agency, while course credit and residence units are arranged by the student and the members of his or her special committee in Human Service Studies.

[610 Seminar in Adult Education Spring. 3 credits. S-U grades optional. Not offered 1979–80. Designed to deal with significant problem areas in adult education. Implications of theory and research in the problem area will be important considerations. One specific problem area will be considered each time the seminar is offered and will be announced at course registration. May be repeated with permission of the instructor.]

[621 Services for Alcohol and Drug Problems Fall. 3 credits. S-U grades optional. Not offered 1979–80. Next offered 1980–81.
A study of the nature and extent of various drug problems, including alcoholism. Special attention will be given to the biological, epidemiological, social, and legal approaches to understanding and controlling alcohol and other drug problems. An overview of prevention, treatment, and rehabilitation services will be presented with implications for program evaluation.]

650 Teaching Human Services in Higher Education Fall. 3 credits. S-U grades optional.
W 12:20–2:50. C. Farris.
Basic strategies for planning and implementing instruction in Human Services in higher education. Types of issues examined by researchers will include variables involved in modes of learning, structure of content, and instructional settings. Emphasis on conceptualizing the teaching and learning process. Students will be expected to develop instructional plans related to interests in the human services and to develop a repertoire of teaching skills through microteaching or classroom teaching.

651 Adult Development and the Provision of Human Services Spring. 3 credits. S-U grades optional.
W 7:30–10:30. D. Deshler.
Provides a survey of theories of adult development. Forces affecting the various periods, stages, passages, life tasks, or roles related to the adult's life cycle will be examined. Biological factors, interpersonal relationships, social and cultural influences, and historical events will be examined in relationship to perspectives on adult development. Opportunity for an empirical investigation of an adult population will be provided. Implications from theories and student-collected data will be examined in relationship to the provision of human services programs.

652 Preparing Professionals in the Human Services Fall. 3 credits. S-U grades optional.
M W F 11:15. M. Minot.
Students analyze the assumptions and concepts that underline preprofessional and continuing professional education for volunteers, paraprofessionals, and professionals in the human services, for example, adult and continuing education, health, home economics, and social work education. A variety of preservice and in-service programs will be analyzed in terms of goals, means of implementation, and evaluation. Factors that influence programs will be examined, including educational setting, licensure, accreditation, legislation, and evaluation of performance. Students will have an opportunity to participate in preservice and in-service educational programs in human service professions and community education and may also develop or modify a model for similar programs.

653 Consulting and Supervisory Roles in Human Services Spring. 3 credits. S-U grades optional.
M 4:40–7:10 p.m. D. Barr.
Analysis of theories and practices of consulting and supervision and their application in higher education and in human service agencies at the national, state, and local levels. There will be observations and application of consulting and supervisory skills in settings related to professional goals of students.

[654 Administration of Human Service Programs in Higher Education Spring. 3 credits. S-U grades optional. Not offered 1979–80. Next offered 1980–81.
Issues that confront administrators of higher education and continuing professional education in the human services will be analyzed: policy in higher education, student selection and retention, program development, program evaluation, accreditation, finance, professional staff development. Issues will be developed by resource persons in the higher education community.]

660 Public Policy and Program Planning in Human Services Fall. 3 credits. S-U grades optional.
T R 12:20–1:35. J. Ford.
A review of public policy process in education, health, and social and welfare services as it pertains to program development. The course includes (1) the history, definitions, and boundaries of the policy process, (2) the relationships of the policy process to political economy, social structure, intergovernmental relations, and cultural values and beliefs, (3) theories of planning and program development in human services, (4) the role of evaluation in program planning and implementation with special emphasis on monitoring and feedback of effects into the policy and planning process, (5) selected current issues in policy and planning processes such as regulatory or legislative constraints, the respective roles of clients or consumers and professional planners and providers, problems and prospects in the coordination among the various human services.

661 Designing and Implementing Human Service Programs Spring. 3 credits. S-U grades optional.
Hours to be arranged. Graduate faculty.
A review of issues in the translation of research, resources, and policy in education, health, and social and welfare services into programs for service to communities and individuals. The course includes issues in need analysis, organizational structure, staffing, budget preparation, fund raising, and community auspice development, as well as internally-based program evaluation, administration, and change in the context of design and implementation.

664 The Intergovernmental System and Human Service Program Planning Spring. 3 credits. S-U grades optional.
W 3:35–5:45. J. Ziegler.
An in-depth review of intergovernmental systems in America and their relevance to the formulation of human service policy and programs. Issues of decision making, fiscal arrangements, and public and private sector interactions will be explored as they are affected by intergovernmental relationships. The course will provide students with an analytic framework for understanding these and other issues that review the relationships within and between various governmental levels.

[673 Belief and Practice in Educational Interventions Spring. 3 credits. Not offered 1979–80.
The professional educator brings a set of beliefs and values and a preferred theoretical orientation to his or her work in schools and other agencies. The educator may find, however, that the agency has institutionalized values and practices at variance with those he or she brings. This seminar will consider the implications for practice of several prevalent belief systems in education and the problems of discordance between individual beliefs and institutional policies related to educational practice.]

679 The Teaching of Home Management in College Spring. 1–3 credits. S-U grades optional. Permission of instructor required.
Hours to be arranged. A. Davey.
An examination of the ways concepts of home management are being taught and the exploration of new teaching approaches.

[680 Seminar in Community Service Education Fall. 1 credit. S-U grades only. Not offered 1979–80. Next offered 1980–81.
An informal seminar for graduate students and faculty. One or two major topics will be considered each term. May be repeated for credit with permission of instructor.]

681 Current Issues in Home Economics Education Fall. 1–2 credits. S-U grades optional.
T 7:30–9:25 p.m. Home economics education faculty.
Different topics and issues related to home economics education will be considered each semester. May be repeated for credit with permission of instructor.

690 Evaluation Fall. 3 credits. For professionals concerned with behavioral change: extension agents, social workers, educational program directors, high school and college teachers and administrators, and research workers. Students without experience in any of these professional postions are admitted only with permission of the instructor.
T R 10:10–11:25. H. Nelson.
Basic principles of evaluative studies in relation to specific methods of appraising progress toward objectives of behavioral change. Opportunities will be given for constructing and using evaluative instruments.

[691 Community Ethnography Spring. 3 credits. Limited to graduate students or exceptionally well-qualified seniors by consent of the instructor. Not offered 1979–80. Next offered 1980–81.
A number of community ethnographies are examined from a standpoint of methods of investigation, substantive results, social theory, orientation of the analyst to setting and subjects, and related issues. Focuses on practical issues such as preparing for fieldwork, entering and withdrawing from the field, notetaking, relating observations to registry or other kinds of data, interning in the field, problems of analysis and report routine with special reference to all-black towns. Members of the seminar should be familiar with race and ethnic relations theory, engaged in an ethnographic study, or have the consent of the instructor.]

692 Survey Research Methods Fall. 3 credits. Prerequisite: at least one course in research methods or permission of instructor.
T 1:25–4:25. C. McClintock.
A practicum course in which students will be presented with a research problem and then design, implement, and analyze the results of an appropriate data collection effort. The course will cover survey design, planning and management, instrument design, sampling, interviewing, and other means of data gathering, field quality control, coding, and data processing and analysis. Selected problems and topics will be given special emphasis, including confidentiality and informed consent, assessment of bias due to nonresponse in sampling and data collection, and omnibus surveys.

693 Secondary Analysis of Survey Data Spring. 3 credits. S-U grades optional. Prerequisite: appropriate experience in field research and computer work.
T 1:25–4:25. C. McClintock.
An intermediate level course focusing on the aggregation of data sets from survey research with emphasis on studies related to planning, design, and evaluation of human services. Relevant to needs assessment, program evaluation, social indicators, and primary or secondary survey work. Course work will include attention to problems and processes of aggregating data vs. findings, acquiring and documenting data sets, and evaluating research methodology.

694 Research Design and Analysis Fall. 2–3 credits. S-U grades only. Students taking HSS 690 or its equivalent may register for 2 credits with consent of the instructor.
M 2:30–5:15. S. Blackwell.
Intended for graduate students with little or no research experience. Parallels HSS 292 in purpose, content, and requirements.

790 Seminar in Evaluation Spring. 3 credits. S-U grades optional. Prerequisites: HSS 690 or equivalent and at least one course in statistics.
W 10:10–1:10. S. Blackwell.
Emphasis on methodological problems of evaluative research. Consideration given to alternative design choices appropriate to particular evaluation models and to compromises that take into account the constraints imposed on the researcher by the real-world context of program evaluation.

899 Master's Thesis and Research Fall and spring. Credit to be arranged. S-U grades optional. Registration with permission of the chairperson of the graduate committee and the instructor.
Hours to be arranged. Department graduate faculty.

999 Doctoral Thesis and Research Fall and spring. Credit and hours to be arranged. S-U grades optional. Registration with permission of the chairperson of the graduate committee and instructor.
Hours to be arranged. Department graduate faculty.

Continuing Education for Professionals

These courses are not a part of the department's regular graduate offerings but are designed to provide continuing education for professionals on an extramural basis.

603 Groups and Organizations Spring. 3 credits. Open only to extramural students from county departments of social services.
T 7:30–10:30 p.m. W. Paine.
A course in the social psychology of small groups and human service organizations. Study of group processes will include self and interpersonal perception roles, norms, communication, power, and leadership. Students will apply what has been learned about small groups to the study of issues in human service organizations.

607, 608 Professional Improvement I and II Fall, spring, or summer. Variable credit. S-U grades optional. Enrollment will be determined by various factors including nature of content, funding, resources, facilities, and instructor. Primarily designed for extramural (evening) and off-campus instruction.
Series of special problem seminars, classes, and activities designed for in-service and continuing education of practitioners in helping professions, such as home economics teachers, social workers, public health planners, adult educators. Specific content of each course will vary with group being served but will include amount of work and class time appropriate to number of credits. May be repeated with the permission of the instructor.

629 Research Design and Analysis Fall. 3 credits. Open only to extramural students from county departments of social services.
T 7:30–10:30 p.m. W. Paine.
Students should develop skill in analyzing and evaluating research reports. Readings, exercises, and periodic assignments focus on stating hypotheses, designing studies to test hypotheses, measuring variables, and interpreting findings.

637 Social Welfare as a Social Institution Fall. 3 credits. Open only to extramural students from county departments of social services.
W 7:30–10:30 p.m. R. Zober.
A philosphical and historical introduction to social welfare services. The course reviews the social contexts from which programs and the profession of social work have evolved and discusses the political and ideological processes through which public policy is formed and how policies are translated into social programs. Basic issues in welfare are discussed in the context of present program designs, public concerns, and the interrelationships and support of services in the community.

646 Ecological Determinants of Behavior Fall. 3 credits. Open only to extramural students from county departments of social services.
M 7:30–10:30 p.m. L. Rattan.
An introductory course concerning the identification of some major determinants of human behavior and their interaction. Students will examine (through readings, papers, and discussion) different ecological perspectives of behavior and attempt to integrate these perspectives into a human services framework. For example, the implications of an ecological perspective for the planning and delivery of services will be emphasized.

670 Social Work Practice Summer. 9 credits. Open only to students from county departments of social services.
Lec, W 1–4; fieldwork, M T R F. C. Shapiro.
An introduction to social work practice through an integrated field and methods course. Comparison of concepts and skills used in casework, group work, and community work. Field experience in problem-solving activities with individuals, families, groups, or communities. Examination of the value base of social work practice. The class meetings are integrated with four days of field instruction each week. Supervised field placements are made in selected social agencies in nearby counties.

674 Program Development in Social Services Spring. 3 credits. Open only to extramural students from county departments of social services.
W 7:30–10:30 p.m. M. Zober.
Deals with program development in the fields in which students are or will be working.

675 Organization and Structure for Delivery of Social Services Spring. 3 credits. Open only to extramural students from county departments of social services.
M 7:30–10:30 p.m. J. Allen.
A framework for assessing and understanding the range of issues posed in the current organization and delivery of various social services. Concepts of social policy analysis will be used to evaluate different social service systems, new models of service delivery being developed, and proposals for change being made at national, state, and local levels. Students should have some form of field or work experience in human services prior to or concurrent with this course.

Independent Interdisciplinary Centers and Programs

Africana Studies and Research Center

See p. 118.

Center for International Studies

The Center for International Studies, 170 Uris Hall, supports and coordinates Cornell's programs of international and comparative studies. By serving as a focal point for ideas, information, and advice about the University's wide range of international offerings, the center contributes to their further development. The center places particular emphasis on strengthening inquiry into issues that cut across disciplinary, professional, and regional concerns, and on providing a continuing source of innovation and experimentation in international studies. The center and its constituent programs promote interdisciplinary teaching and research in international and comparative studies. These programs are:

Area Programs

China-Japan Program (140 Uris Hall).
Committee on Soviet Studies (140A Uris Hall). See p. 125.
Latin American Studies Program (190 Uris Hall). See p. 122.
South Asian Program (130 Uris Hall).
Southeast Asia Program (120 Uris Hall).

Problem-Oriented Programs

International Population Program (372 Uris Hall)
Participation and Labor-Managed Systems (490 Uris Hall)
Peace Studies Program (180 Uris Hall)
Science, Technology, and Development Program (170 Uris Hall)
Rural Development Committee (170C Uris Hall)
Western Societies Program (130C Uris Hall)

Professional School Programs

International Agriculture (261 Roberts Hall)
International Business and Public Administration (526 Malott Hall)
International and Comparative Labor Relations (294 Ives Hall)
International Education Program (N227 Martha Van Rensselaer Hall)
International Legal Studies (404 Myron Taylor Hall)
International Nutrition (127 Savage Hall)
International Planning (200 West Sibley Hall)

Program on Science, Technology, and Society

The Program on Science, Technology, and Society (STS) is an interdisciplinary unit that promotes teaching and research on the interaction of science and technology with political and social institutions. The program draws its students, faculty, and research staff from departments in all colleges of the University. Topics of special concern include science, technology, and public policy; biology and society; technology assessment; citizen participation in technical decision making; arms control and national defense policies; energy policy; environmental law and ethics; and biomedical ethics.

STS courses are normally cosponsored by University academic departments. A list of courses is on p. 125. Further information on courses and the STS Program, as well as a list of STS-related courses offered throughout the University and information concerning individualized courses of study, can be obtained from the program office, 632 Clark Hall (256-3810).

New York State School of Industrial and Labor Relations

Collective Bargaining, Labor Law, and Labor History

J. Gross, chairman; G. Brooks, J. Burton, D. Cullen, C. Daniel, R. Doherty, R. Donovan, H. Finch, M. Gold, K. Hanslowe, G. Hildebrand, R. Keeran, M. Kelly, T. Kochan, G. Korman, D. Lipsky, J. Morris, P. Ross, J. Windmuller

100 History of Industrial Relations in the United States Fall or spring. 3 credits.
C. Daniel, R. Keeran, G. Korman, J. Morris.
This review of the history of industrial relations in the United States emphasizes developments in the twentieth century. The course concentrates on the American worker, both union and nonunion, labor movements, and the environmental forces that have shaped industrial relations in the United States. Readings are selected from scholarly accounts and original sources.

101 Special Studies in the History of Industrial Relations in the United States Fall or spring. 3 credits. Prerequisite: I&LR 100 for ILR students; no prerequisite for out-of-college students.
C. Daniel, H. Finch, R. Keeran, G. Korman, J. Morris.
Several instructors will offer undergraduate classes, each on a particular aspect of the history of industrial relations in the United States. Students will choose among classes that may vary from year to year and cover topics such as: industrial relations in the Age of Jackson and in other periods of American History such as the Gilded Age, the two World Wars, or the Great Depression; the role of industry and organized labor in politics; and radicalism and dissent in the American labor movement.

200 Collective Bargaining Fall or spring. 3 credits.
J. Burton, D. Cullen, T. Kochan, D. Lipsky, P. Ross.
A comprehensive study of collective bargaining, the negotiation and scope of contracts, the day-to-day administration of contracts, the major substantive issues in bargaining, including their implication for public policy, and the problem of dealing with industrial conflict.

201 Labor Relations Law and Legislation Fall or spring. 3 credits.
M. Gold, J. Gross, K. Hanslowe.
A survey of the law governing labor relations. The legal framework in which the collective bargaining relationship is established and takes place is analyzed. Problems of the administration and enforcement of collective agreements are considered, as are problems of protecting individual employee rights in the collective labor relations context. Also serves as an introduction to the legal system and method, and to legal and constitutional problems of governmental regulation of industrial and labor relations.

301 Labor Union Administration Fall. 3 credits. Prerequisites: I&LR 100 and 201.
G. Brooks, C. Daniel, R. Keeran.
A review of the operations of American unions, including a general theoretical framework, but with major emphasis on practical operating experience. Topics include the formal government of unions; organizational or institutional purposes and objectives and how these are achieved; underlying structure and relationship among members, locals, and national organizations; the performance of the primary functions of organizing; negotiating; contract administration; and the effect of the Landrum-Griffin Act.

303 Research Seminar in the Social History of American Workers Fall. 4 credits. Limited to upperclass students who have demonstrated their ability to undertake independent work and who have received permission of the instructor.
G. Korman.
An examination of a different subject each year.

304 Seminar in the History, Administration, and Theories of Industrial Relations in the United States Fall or spring. 4 credits. Prerequisite: permission of instructor.
C. Daniel, R. Keeran, G. Korman, J. Morris.
Designed to explore the social, economic, and political background of industrial relations in the history of the United States. Examines a different subject each year.

306 Research Seminar in the American Labor Movement and Politics Fall or spring. 3 credits. Prerequisite: I&LR 101. Limited to upperclass students who have demonstrated ability to undertake independent work and who have received permission of the instructor.
J. Morris.
Students choose a research topic, using any disciplinary approach (such as law, history, behavioral or political science), within the subject matter area. Group meetings are devoted to (1) discussion in depth of special problems such as compulsory membership and union political spending, the adequacy of the law governing union political action, and labor's partisan ties with the Democratic party, and (2) exchange of research problems and reports. Some time normally devoted to group meetings is scheduled for individual consultations.

307 Industrial Relations Biographies Fall. 4 credits. Limited to juniors and seniors.
J. Morris.
A study of American industrial relations history through the lives of some of the outstanding people who have helped make it — men and women of business, government, and the law as well as leaders of labor and their allies among the intellectuals. While economic forces, institutional developments, and social values are important in shaping history, so also is the role of individual personality. Readings and discussions focus on biographies and autobiographies, supplemented in some cases with tapes and films. There will be written assignments but emphasis will be on the weekly discussion.

380 Famous Trials in American Labor History Spring. 4 credits. Limited to juniors and seniors. Prerequisite: I&LR 100.
J. Morris.
Some of the famous criminal trials involving union leaders, radicals, and ordinary workmen who were unknown before they faced the bar. Among the defendants or cases which may be considered (charges range from fraud to murder) are Jimmy Hoffa, Sacco and Vanzetti, Mooney and Billings, the Centralia tragedy and trial, the great IWW trials of World War I, the case of Joe Hill, the Haymarket anarchists, the trial and execution of the Molly Maguire leaders, and the triple case of Moyer, Haywood, and Pettibone.

381 Jewish Workers in Europe and America, 1789–1948 Spring. 4 credits. Open to sophomores, juniors, and seniors.
G. Korman.
This course in comparative history examines the complex experiences of the Yiddish-speaking immigrant workers and their families. A special subject of interest is the extraordinary history of the Jewish working classes between 1924 and 1948.

401 Collective Bargaining Structures Fall. 3 credits. Prerequisite: I&LR 200.
D. Lipsky.
An examination of the conduct of collective bargaining with emphasis on the size and scope of the bargaining unit and the locus of decision making in collective negotiations. The relation between bargaining structure and product market structure, public policy, and union structure is studied. Industry and case studies of various bargaining structures, including pattern bargaining, coalition bargaining, and multiemployer bargaining are used to illustrate general principles. Wage patterns and the economic effects of bargaining structures are also examined. A seminar course.

407 Contemporary Trade Union Movement Spring. 3 credits. Prerequisites: I&LR 100 or 502 or permission of instructor.
C. Daniel, R. Keeran.
An examination of the contemporary history, administration, policies, and problems of American trade unions. Each semester the course focuses on particular aspects of the labor movements.

498 Internship Fall or spring. 4–6 credits.
Designed to grant credit for individual research under the direction of a faculty member by mature upperclass undergraduates who have been selected for an internship. All requests for permission to register for 498 must be approved by the faculty member who will supervise the project and the chairman of the faculty member's academic department before submission for approval by the Committee on Academic Standards and Scholarship.

499 Directed Studies Fall or spring. 3 credits.
For individual research, conducted under the direction of a member of the faculty, in a special area of labor relations not covered by regular course offerings. Registration is normally limited to seniors who have demonstrated ability to undertake independent work. Eligible students should consult with a counselor in the Office of Resident Instruction at the *time of course registration* to arrange for formal submission of their projects for approval by the Academic Standards Committee.

500 Collective Bargaining Fall or spring. 3 credits. Open only to graduate students. It is recommended that 501, Labor Relations Law and Legislation, be taken prior to or concurrently with 500.
D. Cullen, T. Kochan, D. Lipsky.
A comprehensive study of collective bargaining with special emphasis on philosophy, structures, process of negotiations, and administration of agreements. Attention is also given to problems of handling and setting industrial controversy, the various substantive issues, and important developments and trends in collective bargaining.

501 Labor Relations Law and Legislation Fall or spring. 3 credits.
M. Gold, J. Gross, K. Hanslowe.
A survey and analysis of the labor relations law which examines the extent to which the law protects and regulates concerted action by employees in the labor market. The legal framework within which the collective bargaining takes place is considered and analyzed. Problems of the administration and enforcement of the collective agreement are considered as are problems of protecting the individual member-employee rights with the union.

502 Labor Union History and Administration Fall or spring. 3 credits.
C. Daniel, R. Keeran, G. Korman, J. Morris.
A presentation of the history of labor in America with emphasis on post–Civil War trade union development. Includes an analysis of the structure and functions of the various units of labor organization, ranging from the national federation to the local union, and some consideration of special problems and activities, such as democracy in trade

unions and health and welfare plans, as well as of various types of unions, such as those in construction, maritime trades, entertainment, transportation, and basic industry.

600 Advanced Seminar in Labor Arbitration Spring. 3 credits. Limited to juniors, seniors and graduate students. Prerequisite: I&LR 602 or equivalent and permission of instructor.
J. Gross, K. Hanslowe.
An advanced seminar in labor arbitration emphasizing the practical aspects of current labor arbitration techniques and problems. Subjects considered range from laboratory exercises in the presentation of an arbitration case, the preparation of prehearing and posthearing briefs, and the writing of an arbitration opinion and award, to the investigation and evaluation of the experience of labor arbitrators with selected case problems arising in state and federal employment and public education as well as in the private sector.

601 Integration of Industrial Relations Theories Fall or spring. 3 credits. Open to second-year graduate students and seniors.
T. Kochan.
An exploration of the similarities and differences among the (1) normative premises, (2) theoretical frameworks, (3) substantive issues, and (4) methodological approaches found in the various areas of study in industrial relations. The areas studied include (1) collective bargaining and union-management relations, (2) organizational behavior and personnel, and (3) labor economics and manpower policy. An effort is made to explore the potential for integration among these various areas by discussing some issues or problems that cut across the traditional lines of study.

602 Arbitration Fall or spring. 4 credits. Prerequisites: undergraduates, I&LR 200; graduate students, I&LR 500.
J. Gross.
A study of the place and function of arbitration in the field of labor-management relations, including an analysis of principles and practices, the law of arbitration, the handling of materials in briefs or oral presentation, the conduct of an arbitration hearing, and the preparation of an arbitration opinion.

603 Governmental Adjustment of Labor Disputes Fall or spring. 3 credits. Prerequisites: undergraduates, I&LR 200; graduate students, I&LR 500.
D. Cullen, T. Kochan.
An examination of the various governmental techniques for dealing with labor disputes in both the private and public sectors, including mediation, fact finding arbitration (both voluntary and compulsory), the use of injunctions, and seizure. The course also examines the application of these techniques under the Railway Labor Act, Taft-Hartley Act, and various state acts.

604 Readings in the Literature of American Radicalism and Dissent Fall or spring. 3 credits. Limited to seniors and graduate students.
R. Keeran.
Each term concentration is on a different historical aspect of American radicalism and dissent. Some examples of areas and writers who might be selected for study are: agrarian reform — Thomas Skidmore, George Henry Evans, and Ignatius Donnelly; anarchism — Josiah Warren, William D. Haywood, Emma Goldman, and Paul Goodman; communism — John Reed, Jay Lovestone, and William Z. Foster; economic dissent — Henry George, Thorstein Veblen, and Francis Everett Townsend; equal rights for Negroes and black nationalism — William E. B. DuBois and Marcus Garvey.

605 Readings in the History of Industrial Relations in the United States Fall. 3 credits. Limited to seniors and graduate students. Prerequisites: seniors, I&LR 100 and 101; graduate students, I&LR 502.
C. Daniel, R. Keeran, G. Korman, J. Morris.
A seminar covering, intensively and in historical sequence, key documents, studies, legislative investigations, and memoirs concerning American industrial relations systems. Primarily designed to aid students in orienting themselves systematically and thoroughly in the field. Among the authors and reports covered are E. P. Thompson, John R. Commons, Norman Ware, Lloyd Ulman, the Abram Hewitt hearings, the Henry W. Blair hearings, the United States Industrial Commission, Philip Taft, Paul F. Brissenden, and the United States Commission on Industrial Relations.

606 Theories of Industrial Relations Systems Fall or spring. 3 credits. Limited to seniors and graduate students. Prerequisites: seniors, I&LR 100 and 101; graduate students, I&LR 502.
C. Daniel, R. Keeran, G. Korman, or J. Morris.
An examination of the leading theories concerning the origins, forms, organization, administration, aims, functions, and methods of industrial relations systems. Among the theories studied are those formulated by Karl Marx, Mikhail Bakunin, Georges Sorel, Vladimir Lenin, Lujo Brentano, Beatrice and Sidney Webb, Herbert Croly, Antonio Gramsci, Selig Perlman, Frank Tannenbaum, the Guild Socialists, Karl Polanyi, Clark Kerr, Frederick Harbison, John Dunlop, and Charles A. Myers.

607 Arbitration and Public Policy Spring. 3 credits. Limited to 10 ILR students and 10 law students. Prerequisite: permission of instructor.
J. Gross, K. Hanslowe.
The impact of law and public policy on the arbitration of labor disputes in both the private and public sectors. Some of the topics covered include the law of arbitration, the scope of judicial review, the interaction between Title VII and arbitration, and individual rights to due process in the handling of grievances. Students prepare briefs, argue cases, and write awards. As opportunity permits, students are invited to attend actual arbitration hearings and to write mock awards. Each student also writes a research paper on a topic within the general scope of the course and presents it in summary form to members of the seminar for criticism and evaluation.

608 Special Topics in Collective Bargaining, Labor Law, and Legislation Fall or spring. 3 credits. Prerequisites: undergraduates, I&LR 201; graduate students, I&LR 502.
Staff.
The areas of study are determined each semester by the instructor offering the seminar.

609 Public Policy and Labor Relations Fall. 3 credits. Prerequisites: one term of labor law and some course work in statistics.
T. Kochan, D. Lipsky.
This seminar examines the application of public policy in labor relations, with particular emphasis on the empirical, nonlegal analysis of the impact of national and state laws on the behavior of managements, unions, and workers. Several important public policy questions are examined in the course: What is the real impact of duty to bargain requirements on the behavior of the parties in negotiations? How effective are NLRB remedies in actually changing the behavior of the parties? What are the determinants of certification of election outcomes? What evidence is there on the impact of right-to-work laws on union organizing and bargaining?

680 Problems in Union Democracy Fall or spring. 3 credits.
M. Gold, P. Ross.
Unions are considered as an example of private government, and union democracy is examined by standards and customary practices in both public and private governments. Included are such elements as elections, self-government by majority, rights of minorities, the judicial process including impartial review, local-national relationships, constituency and representation, the legislative process, and executive power and functions. The regulation of private government by the state will be considered.

681 Labor Relations Law Spring. 3 credits. Prerequisite: I&LR 201 or 501 or equivalent.
An advanced course in labor law, concentrating on problems of administering the National Labor Relations Act; the Landrum-Griffin Act; Title VII of the Civil Rights Act of 1964, as amended; the Fair Labor Standards Act, as amended; the Equal Pay Act; the Age Discrimination in Employment Act; the Occupational Safety and Health Act; and state workmen's compensation and unemployment insurance systems.

682 Seminar in Labor Relations Law and Legislation Fall or spring. 3 credits. Prerequisite: permission of instructor. Limited enrollment.
K. Hanslowe.
Legal problems in public employment and other areas of labor relations affecting the public interest.

683 Special Topics in the History, Administration, and Theories of Industrial Relations Fall or spring. 3 credits. Prerequisites: undergraduates, I&LR 100 and 101; graduate students, I&LR 502.
G. Brooks, C. Daniel, R. Keeran, G. Korman, or J. Morris.
The areas of study are determined each semester by the instructor offering the seminar.

684 Employment Discrimination and the Law Fall or spring. 4 credits. Prerequisite: I&LR 201 or 501 or equivalent.
M. Gold.
An examination of legal problems involving employment discrimination based upon race, color, religion, sex, national origin, or age. The impact of developing principles of law on preemployment inquiries and testing, seniority and promotions, and other personnel policies, practices, and procedures are discussed. The requirements of affirmative action under Executive Order 11246, as amended, are analyzed. Special attention is given to the role of state law in resolving employment discrimination claims and the procedural framework for raising and adjudicating such claims before administrative agencies and the courts.

685 Collective Bargaining in Public Education Spring. 3 credits. Prerequisite: permission of the instructor. Limited enrollment.
R. Doherty.
The seminar consists of a study of the legal, financial, administrative and educational problems raised by collective bargaining in the public schools. Major attention will be directed at existing statutes covering the employment arrangement for public school employees, the content and the administration of collective agreements, the ideological postures of teacher organizations, and the resolution of negotiating impasses. Individual and group research projects will be required.

686 Collective Bargaining in the Public Sector Fall or spring. 3 credits. Prerequisites: undergraduates, I&LR 200 and 201; graduate students, I&LR 500 and 501.
J. Burton, R. Donovan, T. Kochan, P. Ross.
An examination of the development, practice, and extent of collective bargaining between federal, state, and local governments and their employees. The variety of legislative approaches to such matters as representation rights, unfair practices, scope of bargaining, impasse procedures, and the strike

against government are considered along with implications of collective bargaining for public policy and its formulation.

687 Current Issues in Collective Bargaining Fall or spring. 3 or 4 credits. Prerequisite: I&LR 200 or 500.
D. Cullen, D. Lipsky, P. Ross.
An intensive study of the most significant current issues and problems facing employers and unions in their relations with each other, with particular emphasis on the substantive matters in contract negotiations and administration of the provisions of collective bargaining agreements. A major research paper is usually required.

703 Theory and Research in Collective Bargaining Spring. 3 credits. Open to graduate students who have had 500 and 723 or their equivalents. Recommended: A statistics course beyond the level of I&LR 510.
T. Kochan, D. Lipsky.
This is a seond-level course in collective bargaining that builds on the institutional research covered in 500. The existing literature in the area of collective bargaining is appraised for its theoretical and empirical content. Efforts are made to explore the appropriate role for theory and empirical analysis in moving research in collective bargaining toward a more analytical perspective, and to identify and appraise the underlying paradigms used to study collective bargaining related issues.

707 Research Seminar in Public Sector Collective Bargaining Spring. 3 credits. Prerequisites: basic familiarity with statistical analysis (correlational and multivariate techniques) and interest in theoretical and empirical research on issues related to public sector labor relations.
T. Kochan, P. Ross.
(1) Discussion of the role of theory in collective bargaining research. Issues such as what is a theory, how is a theory constructed and made operationally testable, and what kinds of theoretical frameworks have been used in public sector research are addressed. (2) Determination of what alternative research strategies have been used and might be used in collective bargaining research. (3) Evaluation of existing theoretical and empirical research in the public sector. (4) Analysis of current and future research needs. Each student submits a seminar paper.

708 Industrial Relations in Health Care Institutions Spring. 3 credits.
G. Brooks, P. Ross.
A study of the laws, institutions, and practices that characterize this rapidly changing field, and of the special complexities of the nonprofit sectors as they appear in health care. Attention is given to the character of the unions in the industry, to the problems of collective bargaining that flow from the nature of the industry and its work force, and to the contractual relations that have developed. The principal economic problems that have complicated the collective bargaining relationship are also discussed. Where appropriate, distinctions are made among public, nonprofit, and proprietary institutions.

799 Directed Studies Fall or spring. Credit to be arranged.
For individual research conducted under the direction of a member of the faculty.

Economic and Social Statistics

P. McCarthy, chairman; I. Blumen, I. Francis, P. Velleman

210 Statistics (Statistical Reasoning) Fall or spring. 3 credits.
An introduction to the basic concepts of statistics: description of frequency distributions (averages, dispersion, and simple correlation) and introduction to statistical inference. Prerequisite to certain of the specialized courses on applications of statistics offered in various departments.

211 Economic and Social Statistics Spring. 3 credits. Prerequisite: I&LR 210.
Application of statistical techniques to the quantitative aspects of social studies. A programming language is taught and students use the computer throughout the course. A continuation of I&LR 210. Topics include statistical description and inference, multiple regression and correlation, index numbers, elements of time series analysis, and the design of sample surveys.

310 Design of Sample Surveys Spring. 3 credits. Prerequisite: one term of statistics.
Application of statistical methods to the sampling of human populations. A thorough treatment of the concepts and problems of sample design with respect to cost, procedures of estimation, and measurement of sampling error. Analysis of nonsampling errors and their effects on survey results (for example, interviewer bias and response error). Illustrative materials are drawn from such fields as market research and attitude and opinion research.

311 Statistics II Fall. 4 credits. Prerequisite: I&LR 210 or permission of instructor.
An intermediate nonmathematical statistics course emphasizing the concepts associated with statistical methods. Includes a treatment of estimation and tests of hypotheses with reasons for choice of various methods and models. Application to problems involving percentage, means, variances, and correlation coefficients with an introduction to nonparametric methods, analysis of variance, and multiple regression and correlation.

410 Techniques of Multivariate Analysis Fall. 3 credits. Prerequisite: I&LR 311.
The techniques of multivariate statistical analysis, the associated assumptions, the rationale for choices among techniques, and illustrative applications. Some matrix algebra and related mathematics are introduced. Includes regression, correlation, principle components, multivariate tests on means, variances and covariances, relations between sets of variates and discriminatory analysis.

411 Statistical Analysis of Qualitative Data Spring. 3 credits. Prerequisite: I&LR 311.
I. Blumen.
An advanced undergraduate and beginning graduate course. Includes treatment of association between qualitative variates, paired comparisons, rank-order methods, and other nonparametric statistical techniques, including those related to chi-squared.

499 Directed Studies For course description, see p. 190.

510 Introductory Statistics for the Social Sciences Fall or spring. 3 credits.
P. Velleman.
A nonmathematical course for graduate students in the social sciences without previous training in statistical method. Emphasis is on discussion of technical aspects of statistical analysis and on initiative in selecting and applying statistical methods to research problems. The subjects ordinarily covered include analysis of frequency distributions, regression and correlation analysis, and selected topics from the area of statistical inference.

610 Seminar in Modern Data Analysis Fall. 3 credits. Prerequisite: I&LR 311 or equivalent.
P. Velleman.
A survey of modern data analysis methods concentrating on analysis of "badly behaved" data. Topics depend upon the interests of those present, but probably include: exploratory data analysis methods, use, and foundations; robust methods (measures of location and scale, robust regression, data smoothing), computer as a data analysis tool. The course covers many practical methods. Data of interest to participants is used to demonstrate applications.

611 Statistical Computing Fall. 3 credits. Prerequisite: a course covering multiple regression and ANOVA, at least one computer programming language (may be studied concurrently), and matrix algebra (Biometry 416–417 may be taken concurrently). Recommended: knowledge of a statistics package.
P. Velleman.
The intelligent use of computers as statistical tools. Subjects from several related disciplines are covered to learn how to compute what should be computed and how to recognize what shouldn't be computed. Topics include discrete arithmetic and error analysis, stable computation of least squares solutions, intelligent selection and use of statistical packages, computer graphics, pseudo random numbers and Monte Carlo simulation, management of statistical data, and design considerations for statistical software.

711 Seminar in Statistical Methods Spring. 3 credits.
I. Francis.
The philosophical problems of drawing inferences from observational data and the use of computer programs in the statistical analysis of behavioral social science data. Exact contents may vary from term to term. A detailed description is available before registration.

712 Theory of Sampling Fall. 3 credits. Prerequisite: calculus and at least one semester of mathematical statistics.
A companion course to I&LR 310, Design of Sample Surveys, stressing the development of the fundamentals of sampling theory. Attention is paid to recent progress in the field. Occasional illustrative material is given to indicate the application of the theory.

799 Directed Studies For course description, see above.

International and Comparative Labor Relations

J. Windmuller, chairman; M. Clark, G. Fields, W. Galenson, G. Hildebrand

330 Comparative Industrial Relations Systems I Fall or spring. 3 or 4 credits.
W. Galenson or J. Windmuller.
An introductory course concerned with the contemporary structure, institutional arrangements, and philosophy of the labor relations systems of several countries in advanced stages of industrialization. Countries examined include: Great Britain, France, Germany, Sweden. A comparative examination of current developments in industrial democracy, incomes policies, labor disputes, and the ties between unions and political parties is also included.

331 Comparative Industrial Relations Systems II Spring. 3 or 4 credits.
W. Galenson or J. Windmuller.
A study of the industrial relations systems of non-Western countries in various stages of economic development and under various political arrangements. The emphasis is on the role of government and trade unions in industrial relations.

332 Labor in Developing Economies Spring. 3 credits.
G. Fields.
The economic problems of labor in less developed

nations. Among the subjects included are: determinants of income and wage structures in less developed countries; labor demand and unemployment; labor supply and migration; human resource policy; and development strategy and employment growth.

430 European Labor History Fall. 3 credits.
J. Windmuller.
The development of trade unions in major European countries, especially Great Britain, France, and Germany between 1850 and 1950. Different patterns of labor organization, the main ideological currents, political party–trade union links, the growth of industrial relations systems, and the evolution of public policies toward labor are emphasized.

499 Directed Studies For course description, see p. 190.

530 Comparative Industrial Relations Systems I Fall or spring. 3 credits. Prerequisite for non-ILR graduate students: permission of instructor.
W. Galenson or J. Windmuller.
An introductory course concerned with the contemporary structure, institutional arrangements, and philosophy of the labor relations systems of several countries in advanced stages of industrialization. Countries studied include Great Britain, France, Germany, Sweden, and others. Also included is a comparative examination of current developments in industrial democracy, incomes policies, labor disputes, and the ties between unions and political parties.

531 Comparative Industrial Relations Systems II Spring. 3 credits. Open to graduate students.
W. Galenson or J. Windmuller.
A study of the industrial relations systems of non-Western countries in various stages of economic development and under various political arrangements. Emphasis is on the role of government and trade unions in industrial relations.

532 Labor in Developing Economies Spring. 3 credits.
G. Fields.
Students in this course attend the lectures in I&LR 332 (see description above). If enrollment warrants they will also meet separately at a time to be arranged for discussion of topics in I&LR 332 and additional topics.

630 Seminar in International and Comparative Labor Problems Spring. 3 credits. Prerequisite: I&LR 330 or 331, or permission of instructor. Intended for students with some background in international and comparative labor relations.
J. Windmuller.
An opportunity for organized reading and research on one or two central themes which change from year to year. In recent years emphasis has been on labor aspects of the multinational corporation, worker participation in management, and international labor movements.

799 Directed Studies For course description, see p. 192.

Labor Economics

R. Ehrenberg, chairman; R. Aronson, J. Burton, R. Butler, G. Clark, G. Fields, W. Galenson, G. Hildebrand, R. Hutchens, O. Mitchell, R. Smith, J. Svejnar

140 Development of Economic Institutions Spring. 3 credits. Prerequisite for non-ILR students: permission of instructor.
G. Clark.
Designed to give the student an understanding of the historical development of our economic institutions and the nature of the problems incident to economic change and development as part of the background for understanding and analysis of important present-day issues. Attention is focused on the agricultural, commercial, and industrial revolutions, tracing their development from their beginnings in Western Europe to the present.

240 Economics of Wages and Employment Fall or spring. 3 credits. Prerequisite: Economics 101–102 or equivalent.
An introduction to the characteristics of the labor market and to analysis of wage and employment problems. Among topics studied are the composition of the labor force, job-seeking and employment practices, methods of wage determinations, theories of wages and employment, economic effects of unions, the nature and causes of unemployment, and programs to combat joblessness and poverty.

340 Economic Security Fall. 3 credits.
R. Hutchens, R. Butler.
History, philosophies, and the economic and social effects of social security measures. Analysis of programs offering protection against economic loss due to industrial accident, temporary and permanent disability, illness, old age, premature death, and unemployment, as well as private and voluntary efforts to provide security, and the problems of integrating public and private programs. An examination is made of proposals for amending or modifying economic security measures, including guaranteed income proposals.

341 Protective Labor Legislation Spring. 3 credits. Open to juniors and seniors.
R. Butler.
A survey of the nature of the problems and the basis for state and federal legislation in areas such as discrimination in employment, migratory labor, industrial health and safety, minimum wages and maximum hours, and child labor. Special attention is given to the problem of maintaining a proper balance among the efforts of industry, organized labor, and government in the development of labor standards. Proposals for amending existing legislation are discussed.

343 Problems in Labor Economics Fall or spring. 4 credits. Prerequisites: I&LR 240 or Economics 311, and background in statistics through regression analysis, or permission of the instructor.
R. Ehrenberg.
An advanced course dealing with the theory and empirical analysis of labor markets and their applications to policy issues. The specific topics covered vary. The course is designed to increase students' competence in applying microeconomic theory and econometrics to policy issues. Each student completes an econometric research project as part of the course.

344 Comparative Economic Systems: Soviet Russia Spring. 4 credits.
G. Clark.
A comparative analysis of the principles, structure, and performance of the economy of Soviet Russia. Special attention is devoted to industry and labor.

346 Economics of Collective Bargaining Fall or spring. 3 credits.
D. Lipsky, J. Svejnar.
Economic aspects of the negotiation, terms, and effects of union-management agreements at the individual firm, industry, regional, and national levels. Topics examined include forces influencing contract demands and terms; employer adaptation to higher wages and benefits; interindustry differences in competitiveness, firm size, and markets; regional location of industry; international competition; government regulations; labor supply; inflation, recession, and unemployment.

347 Capitalism and Socialism Fall. 4 credits. Prerequisite: permission of instructor. Enrollment limited.
G. Hildebrand.
A reading seminar in some of the basic literature of the subject.

440 Health, Welfare, and Pension Plans Spring. 3 credits. Open to juniors, seniors, and graduate students.
O. Mitchell.
An analysis and appraisal of private health, welfare, and pension plans. Consideration of the origin and development of employer, union, and joint programs; a critical examination of the financing, administration, and general effectiveness of the plans.

441 Income Distribution Fall. 3 credits. Open to upperclass and graduate students.
G. Fields.
The sources and distribution of income in the United States. Examination of theories, facts, and value judgments regarding labor, entrepreneurial and capital shares, personal incomes, and policies influencing their distribution.

498 Internship Fall or spring. 4–6 credits. For course description, see p. 190.

499 Directed Studies For course description, see p. 190.

540 Labor Economics Fall or spring. 3 credits. Required of graduate students majoring or minoring in labor economics and income security and M.I.L.R. candidates. Prerequisite: Economics 101–102 or equivalent.
R. Aronson, R. Smith.
Economic issues in the employment and compensation of labor. Topics discussed include labor force growth and composition, structure and functioning of labor markets, unemployment, wage theories, wage levels and structures, the economic influence of unions, income distribution, and the problem of poverty.

541 Social Security and Protective Labor Legislation Fall. 3 credits. Normally required of graduate students majoring or minoring in labor economics and income security and required of M.I.L.R. candidates.
J. Burton.
The fundamental aspects of employee protection and income security. Emphasis is on state and federal minimum wage and hour laws, antidiscrimination legislation, employee benefit programs, social insurances, and public welfare programs. The underlying causes of the legislation, the legislative history, the administrative problems and procedures, and the social and economic impact of the legislation is studied.

640 Economics of Manpower Fall. 3 credits. Prerequisite: I&LR 540 or equivalent; open to qualified undergraduates.
R. Aronson.
Survey of the economic background and selected issues in manpower policy and planning. Labor market processes and behavior involved in the development and implementation of manpower programs are treated systematically. Special topics are arranged in accordance with student interests.

641 Comparative Economic Systems: Soviet Russia Fall or spring. 3 credits. Prerequisite: I&LR 344.
G. Clark.
Preparation and discussion of individual papers on selected topics concerning the Soviet economy.

642 Work and Welfare: Interactions Between Cash Transfer Programs and the Labor Market Fall. 3 credits. Prerequisite: some familiarity with microeconomics.
R. Hutchens.
Emphasizes policy issues in analyzing the relationship between the labor market and cash transfer programs such as social security, public assistance, and unemployment and wages in determining the level and distribution of cash transfers. Investigates the connection between cash transfers and labor supply. Topics include determinants of cash transfer demand and supply, the negative income tax experiments, and program incentives for withdrawal from the labor force (for example, incentives for early retirement implicit in Old Age Insurance). A paper on a specific program is required.

643 Special Topics in Labor Economics Fall or spring. 3 credits.
Devoted to new policy issues and to recent literature in the field. The specific content and emphasis varies in response to the interests of the faculty member teaching the course.

644 The Economics of Occupational Safety and Health Spring. 3 credits.
R. Smith.
The course analyzes the problem of occupational injuries and illnesses in the United States. The first section concentrates on legal requirements, judicial interpretations, and legal implications of the Occupational Safety and Health Act, then shifts to such questions as the need for, and appropriate goals of, the act; the stringency of safety standards considered in a benefit-cost framework; the difficulties in enforcing the act; and estimates of the impact of the act.

645 Economics of the American System of Private Enterprise (also Economics 355/555) Fall. 4 credits.
G. Hildebrand.
A critical examination of the private sector of the United States economy: its history, some leading current relevant issues, and its relation to the theoretical and philosophical interpretations of the market economy.

646 Professional and College-Trained Manpower: Labor Market Issues and Analysis Spring. 3 credits.
R. Aronson.
Explores the nature and behavior of labor markets for highly qualified manpower, including the principal human service and technological professions. Focuses on the supply-demand relationships in these markets and the social, political, and economic institutions affecting the compensation, development, and utilization of professional and technical workers.

647 The Economics of Evaluation Spring. 4 credits.
R. Ehrenberg.
An introduction to the methodologies used by economists to evaluate the impacts of social action programs and legislation. General evaluation methodology, cost-benefit analysis, and econometrics are discussed. Case studies are considered to illustrate the uses of these techniques, to acquaint the student with major current government programs and legislation, and to estimate these programs' economic impacts. Throughout, the primary analytic framework used by the instructor is microeconomics.

648 Economics of the American System of Private Enterprise (also Economics 356/556) Spring. 4 credits.
G. Hildebrand.
A continuation of I&LR 645, although 645 is not a prerequisite to 648.

649 Seminar on Investment in Man Spring. 3 credits. Prerequisite: 540 or equivalent.
R. Butler, G. Fields.
This seminar covers activities that influence future monetary and psychic income by improving the resources in people. The investments covered include schooling, on-the-job training, medical care, migration, and the search for information on prices and incomes, with main emphasis on education and health. Educational planning is also covered.

744 Seminar in Labor Economics Fall. 3 credits. I&LR 744 and 745 constitute the Ph.D.-level sequence in labor economics.
R. Ehrenberg.
Reading and discussion of selected topics in labor economics. Applications of economic theory in the labor market and human resource areas.

745 Seminar in Labor Economics (also Economics 642) Spring. 3 credits.
W. Galenson.
Reading and discussion of selected topics in labor economics in the fields of theory, institutions, and policy.

746 Economic Theory and Labor Market Issues Spring. 3 credits. Prerequisite: I&LR 540 and consent of the instructor.
R. Smith.
This seminar course is intended as a follow-up to I&LR 540 and is designed for students who want a general exposure to economic theory and its applicability to a variety of labor market issues. The first part of the course emphasizes student analyses of assigned topics; during the second half students analyze topics of their own choosing. Topics discussed in the past include day care and labor supply, insurance issues in the labor market, wage and price controls, issues in coal mine safety, immigration policy, and jobs and the environment.

799 Directed Studies For course description, see p. 192.

940 Workshop in Labor Economics Fall or spring. 3 credits. Intended for Ph.D. students who have started to write their dissertations.
Focus is on the formulation, design, and execution of dissertations. Preliminary plans and portions of completed work are presented for discussion.

Organizational Behavior

L. Gruenfeld, chairman, H. Aldrich, S. Bacharach, T. Hammer, N. Rosen, R. Stern, H. Trice, L. Williams

120 Society, Industry, and the Individual I Fall. 3 credits.
R. Stern.
The relationship between industry and the economy as a whole and its implications for other social institutions in American society (including stratification, politics, and American values) is discussed. The nature of industrial organizations and of complex organizations in general, emphasizing authority relations, goals, the division of labor, and bureaucracy.

121 Society, Industry, and the Individual II Spring. 3 credits.
L. Williams.
Deals with the relationship between the individual and the organization and such basic psychological processes as need satisfaction, perception, attitude formation, and decision making. The individual is described and examined as a formal and informal group member. Within this area, particular emphasis is placed on leadership, problem solving, and conflict resolution.

221 Social Issues and Social Theory in Industrial Society Spring. 3 credits.
H. Aldrich.
A survey of the literature on organization-environment and interorganizational relationships.

222 Studies in Organizational Behavior: Regulating the Corporation Fall. 3 credits.
R. Stern.
Public and private power from an organizational perspective. The resource dependence approach to organization-environment relations provides a framework for interpreting government attempts at the regulation of corporate behavior. Topics cover the structure and functioning of government regulatory agencies and corporate responses to regulation including corporate strategy, change, and political influence. The role of interest groups such as consumer or citizens organizations is also considered. Research and case materials focus upon the implementation of environmental protection, occupational health and safety, equal opportunity, anti-trust, and rate-setting regulations.

320 The Psychology of Industrial Engineering Fall. 4 credits.
T. Hammer.
A study of the human factors in the industrial engineering of work, work places, tools, and machinery. The course examines the aspects of individual and social psychology that operate in the work setting and that should be taken into account in the design of jobs. These include limitations of the human sensory system; individual difference in skills, abilities, motives, and needs; group dynamics; intrinsic motivation; job satisfaction; conflict.

322 Cross-cultural Studies of Organizational Behavior Fall. 3 credits. Prerequisite: I&LR 120–121 or equivalent introductory courses to the behavioral sciences including sociology and social psychology.
Comparisons of organizations in terms of cultural similarities and differences. Organizational processes in both industrially advanced and developing societies are examined. Varying attitudes toward work, achievement, and authority are compared. The implications of these differences for the transfer of technological and organizational change are highlighted. Sociological and social-psychological theories and constructs provide the framework for discussion.

323 Introduction to the Study of Attitudes Fall. 4 credits. Open to juniors and seniors.
T. Hammer.
Designed to acquaint the student with what is known about (1) origins of human attitudes, (2) the determinants of attitude change, and (3) the measurement of attitude differences. Studies employing clinical, experimental, and survey techniques are discussed. Each student designs, executes, and analyzes a research study of his or her own.

324 Organizations and Deviant Behavior Spring. 3 credits. Prerequisite: one or more courses in both sociology and psychology. Limited to 40 students.
H. Trice.
Focus is on the relationship between organizations and deviant behavior. Covers (1) the nature and etiology of psychiatric disorders, particularly schizophrenia, the psychoneuroses, and psychosomatic disorders; (2) organizational factors related to these disorders and to the more general phenomena of role conflict and stress; (3) an examination of alcoholism as a sample pathology, in terms of personality characteristics and precipitating organizational factors; (4) evaluation of organizational responses to deviance: (5) the nature of self-help organizations such as Alcoholics Anonymous; and (6) the structure and functioning of the mental hospital.

326 Sociology of Occupations Fall. 3 credits. Prerequisite: one or more courses in sociology.
H. Trice.
Focuses on (1) the changing character of American occupations within the context of social change; (2) occupational status — differences in income, prestige, and power and the resultant general phenomenon of social stratification; (3) vertical and horizontal occupational mobility; (4) recruitment and socialization into occupational roles; (5) the process of professionalization; and (6) comparision of personnel occupations with the career and organizational patterns of other occupations. A major sociological theme is the relationship between occupational structure and workplace structure.

327 Psychology of Industrial Conflict Fall. 4 credits.
N. Rosen.
An application of frustration theory to the analysis of conflict and stress in organizations and society. Comparisons are made between industrial relations, race relations, international relations, and other settings. Readings include behavioral research findings from a variety of studies in industry. Relevant contributions from experimental, social, and clinical psychology are also considered.

328 Cooperation, Competition, and Conflict Resolution Spring. 4 credits. Prerequisite: two courses in social psychology or equivalent.
An examination of theory and empirical evidence relating to the resolution of interpersonal, intergroup, and international conflict. Specific attention is devoted to studying factors that contribute to the development of cooperative or competitive bonds between parties to a conflict. The following topics are studied: the availability and use of threat; the credibility, intensity, and costs of threat; fractioning and escalating conflict. Personality and situational factors that regulate conflict intensification are stressed.

329 Sociological Analysis of Organizations Fall. 3 credits. Prerequisites: I&LR 120 and 121 or equivalent.
S. Bacharach.
This course attempts to introduce students to the basic issues involved in the sociological analysis of organizations. It traces organizational theory from Max Weber to the most recent research. Among the themes to be discussed are: internal structure of organizations, communication in organizations, decentralization, organizational change, organizational technology, and organizational environment.

370 The Study of Work Motivation Fall. 3 credits. Open to juniors and seniors with permission of instructor.
T. Hammer.
Designed to acquaint the student with the basic concepts and theories of human motivation with implications for organizational change and job design. Focus is on theories of worker motivation and on research approaches and results as these apply to individuals and groups in formal organizations. Readings are predominantly from the field of organizational psychology, supplemented by relevant contributions from experimental, social, and clinical psychology. Each student will design, execute, and analyze a research study of his or her own.

371 Individual Differences and Organizational Behavior Fall. 4 credits. There are no formal prerequisites for this course. However, some acquaintance with the substance and methods of behavioral or social science will be helpful.
L. Gruenfeld.
Personality, culture, and organizational behavior. A framework for the study of personality in culture is presented and differences in age, sex, social class, and national character are examined. The relationship between culture and personality is examined to illustrate the influence of the ecological, technological, and economic environments on the formation of personality.

420 Group Processes Fall. 3 credits.
L. Gruenfeld, N. Rosen.
An advanced undergraduate and beginning graduate course emphasizing group development. Readings and discussion are concerned with interpersonal attraction, conformity, interaction process, leadership, group effectiveness, norms, etc. Laboratory experiences in group tasks are provided.

421 Social Organization of the Urban Community Fall. 4 credits.
H. Aldrich.
An examination of the social organization of the urban community, focusing on ethnic and racial ghettos, the police, and business; industrial, political, and educational organizations. The urban community is treated as a group of specialized activity systems, with a view toward studying the interrelation among the various systems. Special attention is given to community conflict such as civil disorders. Students take part in a research project dealing with an urban issue and write a term paper based on the project.

422 Groups in Work Organizations Fall. 4 credits.
N. Rosen.
This is an applied social psychology course which emphasizes the building, maintenance, and renewal of purposive groups working in formal organizations. The course deals with models and variables that interact with group cohesion and performance. Structural, environmental, task, motivational, and interpersonal variables are considered. This is not intended as a sensitivity training lab; the course work is substantive and includes observation and analysis of live work groups in the field.

423 Evaluation of Social Action Programs Fall. 3 credits.
H. Trice.
A consideration of the principles and strategies involved in evaluation research; experimental research designs, process evaluation, and adaptations of cost benefits and cost efficiency to determine the extent to which intervention programs in fields such as training and therapy accomplish their goals. The adaptation of these strategies to large social contexts, such as child guidance clinics, mental health clinics, and programs in the poverty areas such as Head Start is considered. Includes fieldwork and emphasizes assessment of program implementation.

424 Study of Public Sector Bureaucracy Spring. 3 credits. Permission of instructor.
S. Bacharach.
Field research in public sector organizations, such as a school bureaucracy or a social welfare bureaucracy. Students conduct a major study into which they integrate themes from organizational theory. Theoretical issues such as decentralization, participation, and communication are discussed in the seminar.

425 Sociology of Industrial Conflict Spring. 4 credits.
R. Stern.
The focus is on the variety of theoretical and empirical evidence available concerning social, economic, and political causes of industrial conflict. The manifestations of conflict such as strikes, labor turnover, absenteeism, and sabotage, and the influence of the environments in which they occur is emphasized.

426 Theories of Industrial Society Fall. 4 credits. Prerequisite: I&LR 120 and permission of instructor.
S. Bacharach.
Some of the critical issues in social theory to be found in the works of Durkheim, Marx, Pareto, and Weber. Their views of man's relation to society are compared to the views of such literary figures as Balzac, Beckett, Camus, Flaubert, Goethe, Sartre, Stendhal, and Zola.

427 The Professions: Organization and Control Fall. 4 credits.
R. Stern.
The professions (including medicine, law, and several others) are the cases used in this course to examine issues of occupational organization and control. Professional associations attempt to set standards of ethics and practice, regulate educational programs, maintain specific images, and control the supply of entrants to professions. How do such associations function and how successful is their attempt at regulation of professional conduct? How might the potential transformation of some professional associations into union-style organizations be interpreted? These issues are considered in the context of the role of professions in contemporary society.

498 Internship Fall or spring. 4–6 credits. For course description, see p. 190.

499 Directed Studies For course description, see p. 190.

520 Organizational Behavior I Fall. 3 credits.
L. Williams.
Survey of concepts, theories, and research from the fields of organizational and social psychology as these relate to the behavior of individuals and groups in organizations. Job attitudes, motivation, performance, leadership and power, group formation, perception, and organizational climate. A preliminary course for advanced work in organizational behavior.

521 Organizational Behavior II Spring. 3 credits.
S. Bacharach.
Formal organizations are studied from the perspectives of classical organization theory, human relations theory, and comparative and cross-cultural analysis. Contemporary theories and quantitative approaches to organizational structure are also considered in some detail. Intended to be preliminary to more intensive work in organizational behavior.

620 Theories of Organizational Change, Innovation, and Evaluation Fall. 4 credits. Prerequisite: two organizational behavior courses at the 300 level, or advanced courses in sociology or psychology.
H. Trice.
This seminar examines the dynamics of individual, structural, and environmental factors operating in organizational change in general, and in the implementation and use of innovations within formal organizations in particular. The role of evaluative research in assessing the effectiveness of the implementation of innovations and in determining organizational effectiveness are analyzed. Several case studies of organizational change in government, unions, and private industry are examined. The emphasis is on conceptual frameworks for analyzing organizational change and mounting evaluative research on innovations. Readings are interdisciplinary and include sociology, psychology, and political science.

621 Growth of the World Capitalist-Industrial System Spring. 4 credits. Prerequisite: permission of instructor. Limited enrollment.
H. Aldrich.
This course examines the origins of the world-scale capitalist system from the sixteenth century through the beginnings of large-scale industrialization in the U.S. in the late nineteenth century. Emphasis is on concepts and methods for world-systems analysis, rather than on detailed historical knowledge of a specific era. The relevance of world-systems analysis for current international sociopolitical phenomena, including underdevelopment and the rise of

multinational corporations, is discussed. Students play major role in leading class discussions and in choosing topics for discussion.

622 The Organization and its Environment Spring. 3 credits. Prerequisites: two organizational behavior courses at the 300 level, or advanced courses in sociology or psychology.
H. Aldrich.
A survey of the literature on organization-environment and interorganizational relationships. Emphasis is on two tasks: developing typologies of interorganizational relations, and exploring methods of measuring or quantifying such relations. Students in the seminar will be expected to write a research paper in which they apply an organization-environment or interorganizational perspective to a particular set of organizations.

623 Critical Issues in Social Theory Spring. 4 credits.
S. Bacharach.
This course will attempt to examine a variety of critical issues in the analysis of the relationships of man and society. We will attempt to delineate what are now and historically have been the persistent points of controversy. Among the readings considered are *The Structure of Social Action* by Talcott Parsons; *Towards a General Theory of Action* by Parsons and Shills; *Knowledge and Human Interest* by Habermas; *Conflict Sociology* by Randall Collins; *Elementary Forms of Religious Life* by Emile Durkheim; and *Character and Social Structure* by Hans Gerth and C. Wright Mills.

625 Labor and Monopoly Capital: The Growth of Large United States Firms in the Past Century Spring. 2 credits. Course meets for only 7 weeks.
H. Aldrich.
A critical review of two recent books with very different explanations for the rise of large, hierarchically differentiated corporations in the United States: Harry Braverman, *Labor and Monopoly Capital,* and Alfred D. Chandler, *The Divisible Hand.* These books are supplemented by articles on patterns of industrializations and internal structural transformation of large firms in the United States economy.

627 Leadership in Organizations Spring. 3 credits. Prerequisites: two organizational behavior courses at the 300 level, or advanced courses in sociology or psychology.
N. Rosen.
An examination of theories and research findings from the behavioral sciences that are relevant to leadership and the influence process in groups and organizations. Personality, situational factors, intergroup processes, interpersonal perception, as well as motivation to lead and to follow, will be discussed. The implications for leadership training, organization development, and action research are explored.

628 Cross-cultural Studies of Organizational Behavior Fall or spring. 3 credits. Prerequisite: I&LR 520 or 521 or equivalent.
L. Gruenfeld.
An advanced seminar that deals with cross-cultural studies in values, interpersonal relations, and organizational structure. The appropriateness of various organizational strategies to certain cultural and subcultural contexts are considered. Problems relating to authority, decision making, achievement motivation, and change are highlighted.

629 Personality in Organization Fall. 3 credits. Prerequisites: undergraduates, I&LR 371; graduate students, I&LR 520 or equivalent.
L. Gruenfeld.
Several conceptual and methodological approaches are applied to the observation of personality in groups. Students observe, describe, analyze and quantify behavior in ongoing groups. Emphasis is on systematic observation of interpersonal behavior in open field (rather than contrived experimental) groups.

670 Sociological Study of Power Fall. 3 credits.
S. Bacharach.
The empirical, conceptual, and theoretical issues involved in the study of power. Power is analyzed within the context of an interaction paradigm and thus, while the major emphasis of this course is on the examination of power dispersion in organizations and communities, relevant social-psychological literature is also drawn upon. Among the various works to be considered are those of Gamson, Blau, and Dahl.

672 Urban Politics and Public Policy Fall. 3 credits.
S. Bacharach.
The relationship between community processes and structures and public policy outputs. Focus is on such issues as the limitations of the classic elitist/pluralist debate and the recent controversy concerning centralization or decentralization of local government and the delivery of social services. Treatment of these stresses the value of applying sociological theory to questions of public policy. A primary concern is the integration of organizational and community theory.

673 Cross-cultural Explorations of Individual Differences Fall. 3 credits.
A data-bank analysis of the relationship between socioeconomic status, socialization values, ethnicity, and various indices of individual differences such as interpersonal trust, propensity to take risks, self-concept, cognitive style, and job preferences.

674 Social Regulation and Control of Institutions Spring. 2 credits. Prerequisites: two organizational behavior courses at the 300 level, or advanced courses in sociology or psychology. Course meets for only 7 weeks.
R. Stern.
Interorganizational relations are examined in terms of networks of control agents and target objects. The dynamics of control relationships based on political bargaining, the distribution of power, economic rewards and costs, and historical circumstances are examined in the context of their evolution through organizational adaptation to the environment. Subject matter includes theories of organizational change and application of a control perspective to the institutions of American business, government regulations, athletics, and education.

675 Theories of Industrial Society Spring. 2 or 4 credits. Prerequisites: two organizational behavior courses at the 300 level, or advanced courses in sociology or psychology.
S. Bacharach, R. Stern.
A concentrated examination of the sociology of industrial conflict. The seminar focuses on classic formulations of conflict theory in sociology, then examines historical and current empirical work on the social, political, and economic causes of industrial conflict. Forms of conflict studied include strikes, turnover, absenteeism, and sabotage. Some discussion of the implications of various types of worker management of firms for industrial conflict are included. Theories of organizations and communities deal with the parallel development of the organization and community literature. Emphasis is on similarities in theoretical constructs and methodological dilemmas.

677 Seminar in Field Research Spring. 3 credits. Prerequisite: permission of instructor. Enrollment limited.
H. Trice.
Recent research efforts are examined and the dynamic nature of the research process is emphasized. The realities of field research are explored, including problems of gaining and sustaining rapport, the initial development of research interviews and observation data, and their conversion to quantitative instruments. Participants to share in the exploration of appropriate theories and concepts and the possibility of actual field participation in an on-going research project is explored.

722 Theories of Organization Fall or spring. 3 credits, graduate; 4 credits, undergraduate. Prerequisites: undergraduates, I&LR 371 and permission of instructor; graduate students, I&LR 520 and 521.
L. Gruenfeld.
Deals with a set of readings in two subject areas discussed by the professor in previous courses: (1) organizations as political systems, and (2) conceptions of organizations, societies, and individuals in terms of a conceptual framework that distinguishes between community and society. The theme that holds these two sets of readings together focuses on behavior in coercive and utilitarian organizations as distinguished from behavior in communal and voluntary organizations.

723 Behavioral Research Theory, Strategy, and Methods I Fall. 4 credits. Designed to meet the needs of M.S. and Ph.D. candidates majoring in organizational behavior, but other graduate students may enroll.
L. Williams.
Material studied in I&LR 723 and 724 includes: (1) theoretical, conceptual, and ethical questions; (2) survey research and attitude scaling procedures; (3) laboratory research methods; (4) participant observation and interview methods; (5) use of documents and qualitative data analysis. Provides students with important philosophical background for doing research and exposes them to a well-balanced, interdisciplinary set of quantitative and qualitative research tools.

724 Behavioral Research Theory, Strategy, and Methods II Spring. Credit variable. Permission of the instructor required. Must be taken in sequence with I&LR 723 except by petition. Designed to meet the needs of M.S. and Ph.D. candidates majoring in organizational behavior but other graduate students may enroll.
T. Hammer.
See I&LR 723 for course description.

725 Analysis of Published Research in Organizational Behavior Fall. 3 credits. Prerequisites: I&LR 520–521 and one year of statistics.
N. Rosen.
An advanced research methods course that examines critically published research papers in the field of organizational behavior in terms of research design and method as well as theory.

726 Organizational Behavior III Spring. 3 credits. Prerequisite: I&LR 520–521 or equivalent.
S. Bacharach.
A team-taught comparison of different disciplinary approaches to organizational analysis and models. Emphasis is on integrating different disciplinary approaches to selected organizational phenomena such as change and innovation, decision making and information processing, reward structures, or conflict resolution.

728 Seminar on Work Motivation Spring. 2 or 4 credits. Prerequisite: I&LR 520–521.
T. Hammer.
Two independent but sequence-connected minicourses.
(1) *Theories of Work Motivation:* 6½ weeks. 2 credits. This course will provide an overview of basic concepts of human motivation with implications for theory and research. Intended to provide a basic understanding of theoretical issues involved in work motivation and knowledge of basic research

approaches as these apply to individuals and groups in formal organizations.
(2) *Seminar on Job Design:* 6½ weeks. 2 credits. In the seminar, theories underlying the design of jobs are examined together with empirical research available in the job design area. The course will cover early theories and research in job design, from scientific management and later developments, with particular attention paid to the recent emphasis on job design through job enlargement and job enrichment.

799 Directed Studies For course description, see p. 192.

Personnel and Human Resource Management

L. Dyer, chairman; V. Briggs, T. DeCotiis, G. DelaCruz, J. Farley, F. Foltman, W. Frank, F. Miller, S. Muller, R. Risley, W. Wasmuth, W. Wolf

260 Personnel Management Fall or spring. 3 credits.
G. DelaCruz.
An introductory overview of the personnel function and the management of human resources from an institutional perspective. Topics include human resource decisions dealing with the roles of personnel, human resource, planning, recruitment, selection, induction and orientation, performance appraisal, talent identification, career planning, training, compensation, and organizational development. Emphasis is on (a) problem-solving and decision-making approaches (b) operational methods, technologies, and practices (c) application of relevant behavioral science theory and research and (d) legislation and other environmental constraints having an important bearing on "the effective utilization of human resources" by an enterprise.

261 Laborpower and Public Policy Spring. 3 credits. Open to sophomores, juniors, and seniors.
F. Foltman, S. Muller.
The course concentrates on the macroeconomic facets of the United States manpower policies and programs; their history, development, implementation, evaluation, impact, theoretical foundation, and future.

262 Urban Problems and Manpower Programs Fall. 4 credits. Prerequisite: I&LR 261 or equivalent, or permission of instructor.
R. Risley.
A seminar concerned with selected urban problems and manpower service programs developed to cope with them. Consideration is given to both public and private programs, their organization, and comparative methods of operation. Each student is required to conduct a study of a selected organization involving field research.

361 Effective Supervision Fall. 3 credits. Prerequisite: I&LR 260 or equivalent.
W. Wasmuth.
This course covers twenty-five major topics which make a critical difference in the life of a newly appointed or experienced supervisor. Theoretical and real-life case examples are provided from office, factory, union, nonunion, large, and small organizations and cover technical, psychological, social, and political issues at the supervisory level.

363 Techniques and Theories of Training in Organizations Fall. 3 credits.
F. Foltman, W. Frank.
A course directed toward (1) examination of basic psychological formulations of learning relevant to the training of personnel in organizations; (2) review of the methods available for use in organizational training.

364 Communication in Organizations Fall. 3 credits.
W. Frank.
Devoted primarily to the study and analysis of organizational communication. Emphasis is on the examination of the communication process, models, meaning and language, channels and networks, and interpersonal and intergroup issues.

366 Women at Work (also Women's Studies 366) Fall. 4 credits. Prerequisite: I&LR 260 or equivalent.
J. Farley.
Various aspects of female occupational roles in twentieth-century United States. Historical, social, and legal factors that influence women's choice of careers, work socialization and training, and subsequent labor market experience are considered. Working women's entry-level jobs, opportunities for advancement, and income are compared to men's.

367 Organization Development: Strategy and Practice Fall. 3 credits. Open to graduate students.
F. Foltman.
The study of models, theories, and methods used in changing entire organizations or major organizational subunits. Consideration is given to current methods and strategies for improving individual or group performance including laboratory training, consultancy, sensitivity training, grid training, and other planned interventions. Organization development approaches are compared and contrasted with classical individual training models.

368 Manpower and State Legislative Process Spring. 4 credits. Upperclass students with permission of instructor.
R. Risley.
This course is designed to provide students with an understanding of the legislative process in New York State and current issues in the area of manpower and related topics being considered by the legislature. Each student works with a legislator to research an assigned topic and prepare appropriate legislative memoranda as a major part of the course work.

461 The Social Tensions of Labor Market Reform Spring. 3 credits.
S. Muller.
Examines the social implications of recent changes in traditional work roles among minority groups, adult women, rural migrants, and youths. Special emphasis is given to market adjustments brought about by the equal opportunity, welfare reform, and manpower legislation of the 1960s and 1970s.

462 Occupational Analysis and Manpower Planning Spring. 3 credits. Prerequisite: I&LR 260 or equivalent.
F. Miller.
The course combines a practicum aspect — intensive practice in job analysis observations and interviews — with systematic study of how occupational information so obtained can be used in manpower planning at the level of the community or the work organization.

464 Personnel Problems Fall. 3 credits.
Staff.
This course provides students with an opportunity to meet practitioners and to link personnel theory with current practice.

465 Manpower Issues and Applications Fall. 3 credits.
S. Muller.
Provides an overview of economic and social issues involved in national manpower policies and their applications to particular industrial or occupational labor markets. Students study an industry or occupation of their choice, to show how labor is allocated within this market, what the social impacts of these processes are, and how existing public and private manpower policies affect these outcomes.

466 Women in Blue Collar Occupations (also Women's Studies 466) Spring. 3 or 4 credits.
J. Farley.
This course focuses on women's participation in blue collar occupations in the United States. Sources of evidence include census data, evidence from social science surveys, and personal accounts. Students enrolled for 4 credits participate in a class project.

467 Job Creation: Policy Emergence and Current Issues Fall. 3 credits.
V. Briggs.
The evolution of public policy initiatives designed explicitly to create jobs. Most of the attention is given to developments in the United States but related efforts in other nations will also be examined. The reasons why job creation was a late addition to human resource policy are explored. Special attention is given to the associated policy issues: among these are targeting, substitution, job restructuring, union attitudes, and participation of community-based institutions.

469 Human Resources and Immigration Policy in the United States Spring. 3 credits.
V. Briggs.
The role that immigration has played as a source of human resource development in the United States. The primary focus is on developments since the Immigration Act of 1965. In addition to legal immigration, the topic of illegal immigration and its effects are also examined. Public policy aspects of the issue are explored in depth.

498 Internship Fall or spring. 4–6 credits. For course description, see p. 190.

499 Directed Studies For course description, see p. 190.

560 Personnel Management Fall or spring. 3 credits.
T. DeCotiis, L. Dyer.
A survey course covering the major areas of manpower and organizational management as they relate to human behavior in work organizations. Consideration is given to such aspects of personnel work as job attitudes, motivation, manpower planning, recruitment and selection, training, management development, organization development, and compensation. Emphasis is on the application of theory and research to the solution of personnel problems.

659 Career Planning and Development Fall. 3 credits.
F. Foltman.
Consideration of the individual's career planning and development as well as career planning and development from the organization's perspective.

660 Seminar in Personnel or Human Resource Management Fall or spring. 3 credits.
Staff.
A "floating" seminar designed to give faculty and students an opportunity to pursue specific topics in detail. Topics vary from semester to semester. Interested students should consult current course announcements for details.

661 Public Policy and Development of Human Resources Fall. 3 credits.
V. Briggs.
A review of the development of human resource policy and programs in the United States. Includes the older programs of apprenticeship and vocational education. A review of labor market trends and the human resource program responses of public policy. Changes in the "older" programs of apprenticeship, vocational education, and vocational rehabilitation as well as the evolution of the "new programs" of the 1960s and 1970s are studied. Special issues pertaining to youth, rural workers, welfare reform, and public service employment are studied. Comparisons are also made with comparable European initiatives.

662 Management Training Simulation: Public Policy Issues in Social Agencies Spring. 3 credits. Prerequisite: I&LR 260 or equivalent.
W. Wasmuth.
Techniques of simulation are applied to a vocational rehabilitation facility, a community hospital, and a hotel banquet operation. Although much of the material relates to health services management, simulation as an approach to training managers has wider and growing importance to all types of organizations. Students are provided with realistic problem-solving situations involving boards of directors, community resources, public policy issues, state and federal agencies, labor unions, and changing economic conditions.

663 History of Contemporary Management Thought Fall. 3 credits.
W. Wolf.
A critical review of the works of the major contributors in terms of the development of their ideas and their impact. Tape recorded interviews with Barnard, Simon, Drucker, Urwick, and others are studied.

664 Management and Leadership Development Fall. 3 credits. Prerequisite: I&LR 260 or equivalent.
T. DeCotiis, L. Dyer, F. Foltman.
Consideration is given to both individual and organizational determinants of managerial effectiveness and methods used to influence these. Topics include defining and measuring managerial effectiveness, motivation theory, staffing at the managerial level, individual training and development, and organization analysis and development.

665 Case Studies in Personnel Administration Fall. 3 credits.
T. DeCotiis, F. Foltman, W. Wasmuth.
An analysis of personnel management activities and their impact on organizational objectives and administration. Cases, incidents, and field data, derived from a variety of institutional settings, provide a framework for examining and explaining the various roles played by personnel managers. When it is appropriate, attention is given to the evolution and formalization of personnel activities within growing small business organizations.

666 Administrative Theory and Practice Spring. 3 credits. Prerequisites: advanced undergraduates, I&LR 120–121 or its equivalent and permission of instructor; graduate students, I&LR 520 or permission of instructor.
W. Wolf.
A general survey of the theory and practice of administration. Attention focuses on organizational differentiation and its implication for managerial practices. Taught around cases and field studies. Topics include theories and approaches to administration, organizational diagnosis, managerial practices, and organizational dynamics.

667 Current Issues and Research in Human Resources Development Fall or spring. 3 credits.
F. Foltman.
A graduate seminar centering on selected issues and relevant research involved in the development of managerial and work-force skills (particular emphasis is determined by the seminar group). Papers and class discussions might concentrate on such topics as management development, impact of technological change on training programs, development of scientific and professional personnel, or labor union education.

668 Manpower Planning, Selection, and Utilization Fall. 3 credits. Prerequisites: I&LR 260 or equivalent and one year of statistics; working knowledge of factor analysis, item analysis, regression analysis, and ANOVA.
T. DeCotiis, L. Dyer.
An analysis of the staffing process as applied to employing organizations. Topics examined include sources of manpower, methods used to assess individual differences, methods used to assess organizational job requirements, problems associated with man-job matching, career planning, employee separations, and the relationship between the staffing process and other organizational processes.

669 Administration of Compensation Spring. 3 credits. Prerequisite: I&LR 260 or equivalent.
G. DelaCruz.
The development and administration of wage and salary programs. Major emphasis is given to the role of compensation in attracting, retaining, and motivating employees. Topics investigated include motivation theory, factors influencing compensation levels, job evaluation, forms of compensation, including incentive plans and fringe benefits, special issues of managerial compensation, and problems of compensation control.

690 Top Management Personnel Strategies and Policies Spring. 3 credits.
W. Wolf.
Personnel management policies and strategies from the perspective of top management. Vice presidents of personnel of major United States corporations are invited as guest lecturers, providing students with an opportunity to get to know these people and to find out what they and their companies are doing. Areas covered include the job of the top personnel officer, formal and informal organization relative to managing the personnel function, current issues, and problems of top-level personnel managers.

691 Human Resource Planning Spring. 4 credits. Prerequisites: I&LR 260 or 560 or the equivalent and one course in statistics.
L. Dyer.
The process of human resource planning as practiced by public and private employers. Included are topics such as: forecasting human resource needs, programming, techniques to meet forecasted needs, and methods of controlling an organization's supply of human resources. The seminar is organized around a computer simulation game in which students make policy and program decisions over a simulated two-year period for a fictional organization. Decisions are evaluated on the basis of their contributions to the organization's human resource and profit objectives.

692 The Appraisal and Diagnosis of Organizations Fall. 3 credits. Prerequisite: I&LR 120 and 260.
W. Wolf.
This seminar focuses upon the understanding of organizations in a holistic framework. It deals with the process of diagnosis, techniques for gathering data, analysis of the functional areas of management, and interpretation and synthesis of findings. Field study and laboratory training are emphasized. The point of view taken is that of the administrator or consultant.

693 Design and Administration of Training Programs Fall. 3 credits. Prerequisite: I&LR 260 or equivalent.
F. Foltman, W. Frank.
An analysis and exploration of the training and retraining function as applied in business, government, and industrial organizations. Consideration is given to learning theory as well as to the concept framework and practical approaches with which learning activities are developed at the workplace at all levels.

694 Seminar on the Theory and Practice of Organization Development Spring. 3 credits.
W. Wolf.
Organization practices for self-renewal and conflict management. The point of view taken is that of a third party interventionist and the course focuses on techniques for diagnosis and treatment of organizational problems. Topics include: the third party's role and entry dynamics; clinical diagnosis of functioning organizations; confrontation; goal setting; mirror exercises; force field analysis; team building exercises; structural changes and job design issues. Emphasis is on experiential learning.

695 Local Government Manpower Planning and Administration Spring. 4 credits. Students should have previous academic courses and/or experience in local government or manpower programs.
R. Risley.
A seminar devoted to the study of local government manpower planning and administration. Students study federal and state functions and the activities of local governments, particularly counties in New York State, in the implementation of manpower programs.

696 Personnel Administration and Government Regulations Fall. 3 credits.
R. Risley.
A survey and analysis of government regulations affecting manpower administration and personnel management in nongovernment organizations, examining the framework within which management must operate. Government agencies' methods of enforcement of such regulations and the firm's responsibilities for failure to comply with these legal requirements are considered.

697 Sex Roles and Career Patterns (also Women's Studies 697) Spring. 3 or 4 credits. Prerequisite: graduate standing or 6 credits of personnel and human resource management or women's studies, or permission of instructor.
J. Farley.
An examination of the extent to which sex-role expectations affect career patterns of women and men in twentieth-century United States.

698 Manpower Programs for the Unemployed Spring. 3 credits. Prerequisites: I&LR 661 or equivalent.
S. Muller.
Study of the design and delivery of local manpower programs for the unemployed and "hard-to-employ." The following general areas will be analyzed: the present delivery system, decentralization and subcontracting, analyzing the job requirements of the local labor market and the needs of the unemployed, utilization of career and training resources at the local level, evaluation, and recycling.

699 The Debate Over Full Employment Spring. 3 credits.
S. Muller.
Focus is on alternative points of view regarding what constitutes a satisfactory level of employment consistent with social justice and economic stability, as well as the pros and cons of various policies aimed at maintaining "satisfactory" employment levels. Class discussions will concentrate on such topics as the 1946 Employment Act, the Equal Opportunity and Full Employment (Humphrey-Hawkins) Act, the relationship between national employment policy and social problems, and the relative success of various European manpower programs.

761 Occupational Aspects of Manpower Studies Spring. 3 credits. Prerequisite: I&LR 560 or equivalent.
F. Miller.
After learning how job analysis is done and how it contributes to conventional personnel practices, the seminar will consider individual and community needs for systematic information about occupations. Special attention is given to problems experienced by youth, especially minority youth, and women of all ages in getting information about and access to rewarding careers in organization and professions.

799 Directed Studies For course description, see p. 192.

Interdepartmental Courses

150 Labor Problems in American Society Fall or spring. 3 credits.
R. Aronson, O. Mitchell.
A survey for students in other divisions of the University. An analysis of the major problems in industrial and labor relations; labor union history, organization, and operation; labor market analysis and employment practices; industrial and labor legislation and social security; personnel management and human relations in industry; collective bargaining and the settlement of industrial disputes; and the rights and responsibilities of employers and employees.

151 Personnel Management for Managers Fall or spring. 3 credits. Not open to ILR students.
F. Miller, W. Frank, W. Wasmuth, W. Wolf.
A study of the personnel function in work organizations with special emphasis on the responsibilities of managers and supervisors. After reviewing evidence from behavioral science research on factors affecting work behavior, such major personnel areas as recruitment, selection, and placement; training; compensation and benefits, and discipline are considered.

650 Manpower and Collective Bargaining Problems in the Construction Industry Spring. 3 credits. Open to seniors and graduate students, and non-ILR students with permission of the instructor.
D. Cullen, F. Foltman.
Selected manpower and collective bargaining problems in the construction industry are examined, such as supply and demand of construction manpower; the Negro and the building trades; skilled manpower forecasting and planning; skill requirements; education and training; personnel management policies and practices; the wage-price issue; the closed shop; featherbedding; jurisdictional disputes; and problems of bargaining structure. Individual research is required.

Law School

First-Year Courses

500 Civil Litigation and Professional Responsibility

502 Constitutional Law

504 Contracts

506 Criminal Justice

508 Practice Training I

509 Practice Training II

512 Property

515 Torts

Second-Year Electives

550 Accounting for Lawyers

552 Agency and Partnership

554 Commercial Law

556 Commercial Paper and Banking Transactions

558 Corporations

560 Economics for Lawyers

562 Enterprise Organization

564 Evidence

565 Evidence

567 Federal Income Taxation

569 Process of Property Transmission

571 Trusts and Estates I

572 Trusts and Estates II

Second- and Third-Year Electives

600 Administrative Law

602 Admiralty

604 Advanced Antitrust: Economics, Policy, and Enforcement

606 Advanced Civil Procedure

610 Antitrust Law

612 Children and the Law

614 Civil Liberties

616 Collective Bargaining in Public Employment

618 Comparative Law

620 Conflict of Laws

621 Conflict of Laws

623 Contemporary Legal Theory

625 Criminal Procedure I

626 Criminal Procedure II

628 Debtor-Creditor Law

630 Development of Anglo-American Common Law

632 Employment Discrimination

633 Environmental Law

635 Estate and Gift Taxation

637 Family Law

639 Federal Courts

641 Federal Jurisdiction

643 Individual Rights and Institutional Authority

645 Institutional Investors

649 International Law

655 Labor Law

660 Land-use Planning

662 Law and Medicine

664 Law Practice Dynamics

666 Law, Society, and Morality

670 Legislation

672 Local Government

676 New York Practice

678 Regulated Industries

680 Restitution

682 Securities Regulation

684 Supervised Writing or Teaching

686 Taxation of Business Enterprises

689 Trial Practice

691 Trial Techniques

696 Welfare Law

Seminars and Problem Courses

700 American Legal Theory

705 Arbitration and Public Policy Seminar

710 Comparative Law Seminar

712 Constitutional Theory

717 Copyright, Trademark, and Patent Law

720 Corporate Practice

725 Criminal Trial Practice

730 Energy Regulation

735 Equal Protection Seminar

737 Estate Planning

740 Ethics of Corporate Practice

743 Evidence Codification and Reform

750 Fiduciary Administration

755 International Business Transactions

757 International Law Problems

763 International Tax Planning

767 Juvenile Justice

775 Legal Aid I

776 Legal Aid II

780 Legal Control of State Coercion

783 Legal Education and the Legal Profession

785 Organized Crime Control

787 Problems in Environmental Law

790 Problems in Legislation

793 Problems in Urban Development

Division of Nutritional Sciences

M. C. Nesheim, director; M. M. Devine, associate director for academic affairs; E. E. Hester, graduate faculty representative; M. Morrison, division honors representative; J. Apgar, G. Armbruster, R. E. Austic, A. Bensadoun, C. A. Bisogni, T. C. Campbell, G. R. Combs, W. L. Dills, A. Gillespie, J. D. Haas, J. Habicht, L. R. Hackler, R. Holmes, B. Hopkins, M. Immink, M. Kazarinoff, R. Klippstein, L. P. Krook, S. Kumanyika, M. C. Latham, D. A. Levitsky, B. A. Lewis, M. Mapes, D. B. McCormick, D. Miller, N. Mondy, C. Olson, M. Pimentel, M. Reed, J. M. Rivers, D. A. Roe, D. Sanjur, R. Schwartz, M. L. Scott, M. Stipanuk, M. Suozzo, E. Thorbecke, V. Utermohlen, D. VanCampen, P. J. VanSoest, R. G. Warner, R. H. Wasserman, E. K. Woodruff, R. J. Young, D. B. Zilversmit

115 Ecology of Human Nutrition and Food Fall or spring. 3 credits. S-U grades optional. Prerequisites: *fall:* high school biology; junior and senior students with advanced biological science background must have permission of the instructor; *spring:* a one-semester college biology course or permission of the instructor.

M W F 9:05. M. Devine.

An introduction to the field of human nutrition and food that focuses on the mutual relationships between individuals and their biological and physical environment. Includes study of human nutritional needs, problems encountered in providing food to meet nutritional needs, relationships among physiological needs, sociocultural systems, food, and the significance of these relationships to the attainment of health.

146 Introductory Foods Fall or spring. 3 credits. Limited to 16 per section. S-U grades optional. Prerequisite or concurrent registration in NS 115 and permission of instructor, which must be received during course registration (forms are available at 335 Martha Van Rensselaer Hall and should be returned there).

Lec, fall: M 11:15; spring: M 10:10. Lab, W F 10:10–12:05; or T R 10:10–12:05 or 2:30–4:25. M. Pimentel.

Criteria for evaluating the practice of the science of food and nutrition. Laboratory includes an introduction to the physiochemical properties of food and the relationship of these properties to preparation, techniques, and food quality. Some meal preparation, focusing on human nutritional needs and the management of money and time, is included.

222 Maternal and Child Nutrition Spring. 3 credits. S-U grades optional. Prerequisites: NS 115 and a college biology course.

M W F 11:15. V. Utermohlen.

Involves a study of the nutritional requirements in pregnancy, lactation, and growth through adolescence. Topics include the relationship between maternal diet and pregnancy outcome; analysis of different methods of infant feedings; nutritional status of pregnant women, children, and adolescents in the United States; and the interrelationships between nutrition and mental development.

246 Introduction to Physiochemical Aspects of Food Fall or spring. Limited to 18 per section. 4 credits. S-U grades optional. Prerequisites: a college course in organic chemistry or biochemistry; NS 146; and permission of instructor, which must be received during course registration (forms are available at 335 Martha Van Rensselaer Hall and should be returned there).

Lec, T R 9:05; lab, T R 10:10–12:35 or M W 2–4:25. E. E. Hester.

A study of (a) the colligative properties of solutions; (b) collodial systems — sols, gels, foams, and emulsions; (c) physical and chemical properties of the major groups of foods, the effect of basic methods of food preparation and preservation on these properties, and their relation to food quality, especially color, flavor, and texture. Laboratory experience in comparative cookery provides an introduction to the experimental study of food and illustrates the functions of ingredients and effect of treatment on food quality.

300 Special Studies for Undergraduates Fall or spring.

For special arrangement of course work to establish equivalency for courses not transferred from a previous major or institution. Students prepare a multicopy description of the study they wish to undertake on forms available from the Counseling Office. The form, signed by both the instructor directing the study and the associate director for academic affairs, is filed at course registration or during the change-of-registration period.

301 Nutritional Aspects of Raw and Processed Foods (also Food Science 301) Spring. 3 credits. Prerequisite: NS 115 or permission of the instructor.

M W F 9:05. D. Miller.

A nutritional evaluation of foods available in the U.S. Topics will include food labeling, food consumption patterns, criteria for the nutritional evaluation of foods, nutrient composition of foods, effects of agricultural practices on nutritional quality, effects of commercial processing on nutrients including brief descriptions of food processing methods, the nutrient composition and nutritional role of fabricated foods, the nutritional value of fast foods, nutrification of foods, and food additives.

302 Orientation of Field Study in Extension Fall. 2 credits. S-U grades only. Enrollment limited to 10. Prerequisites: NS 331 and permission of instructor.

F 1:25–3:25, plus hours to be arranged for field trips to nearby counties as students' schedules permit. R. Klippstein.

Working closely with the extension faculty, each participant will prepare and test an educational tool suitable for a selected lay audience in a county extension program setting. Experiences will include visits to field sites, determination of the characteristics and needs of the selected audience, and preparation of program materials using a variety of media. Opportunity to use the materials in a county extension program will be arranged. Self and group evaluation will be practiced.

325 Sociocultural Aspects of Food and Nutrition Fall. 3 credits. Prerequisites: NS 115, a college course in anthropology or sociology, and junior or senior standing.

M W F 2:30. D. Sanjur.

The course offers a cross-cultural perspective for understanding the environmental and sociocultural parameters affecting the development of food consumption patterns. Emphasis given to theories on the formation of food habits, dietary methodologies, ethnicity and food habits, and educational programs in nutrition, both in a national and international context.

331 Physiological and Biochemical Bases of Human Nutrition Spring. 3 credits. S-U grades optional. Prerequisites: Bio S 330 or 331 and NS 115 or equivalent.

M W F 10:10. C. Campbell and M. C. Nesheim.

Focus on the biochemical and physiological bases for human nutrition requirements. Includes treatment of energy metabolism, food intake regulation, protein amino acids, minerals, vitamins, and determination of nutritional status.

332 Laboratory in Nutrition Fall and spring. 3 credits. Limited to 18 students per section. Prerequisites: NS 331 or concurrent registration and permission of instructor, which must be received during course registration (forms are available at 335 Martha Van Rensselaer Hall and should be returned there). Not open to students who have taken NS 232.

Lec T 8; M W 1:25–4 or T R 1:25–4. M. Stipanuk.

Introduction to principles and procedures of experimental design, analytical techniques, and data analysis in human nutrition. Emphasis on methods of analysis of nutrients and metabolites in food, tissues, and body fluids. Application of these methods in assessing physiological and biochemical responses to alterations of nutrient intake in animal and human studies.

346 Consumer Food Issues Fall. 2 credits. S-U grades optional. Prerequisites: junior or senior standing, NS 115 and NS 246 or permission of instructor.

W 7:30–9:25 p.m. C. Bisogni.

An examination of selected consumer food issues as related to legislation, regulations, product labeling, nutrition, and food safety. Students will investigate relevant research and the impact of proposed solutions on consumers and the food supply.

347 Human Growth and Development: Biological and Social Psychological Consideration (also HDFS 347) Spring. 3 credits. Prerequisites: Bio S 101 or 109 or equivalent; HDFS 115 or Psych 101 and NS 115 or equivalent.

M W F 1:25. J. Haas and H. Ricciuti.

A review of major patterns of physical growth from the fetal period through adolescence, with consideration given to biological and socioenvironmental determinants of growth, as well as to physical and psychological consequences of variations in growth patterns. Normal patterns of growth will be examined, followed by an analysis of major sources of variations in growth (normal and atypical).

361 Biochemistry and Human Behavior (also Psych 361) Fall. 3 credits. Prerequisites: Bio S 101–102, Chem 103–104, Psych 123, or permission of instructor.

M W F 11:15. D. Levitsky.

A survey of the scientific literature on the role of brain and body biochemical changes as determinants of human behavior. The topics covered will include action and effects of psychopharmocologic agents, biochemical determinants of mental retardation, biochemical theories of psychosis, and effects of nutrition on behavior. A fundamental knowledge of human biology and chemistry is essential.

378 Management Principles in Food Service Operation Spring. 4 credits. S-U grades optional. Prerequisites: NS 246 and Ag Ec 220 or H Adm 211 or I&LR 121 or I&LR 151 or I&LR 260 or I&LR 363 or equivalent, or permission of instructor.

T R 10:10–12:05. R. Holmes.

Application of management principles to food service operations involved in production, distribution, and service of quality food in quantity. Includes layout, design, menu planning, and food cost control. Estimated cost of field trips, $5.

398 Honors in Nutritional Sciences Fall. 1 credit. S-U grades only. Open only to students admitted to the division honors program.

R 2:30. Division faculty; coordinated by chairperson of honors committee.

Research design. Delineation of honors research problem in consultation with a faculty adviser.

400–401–402 Special Studies for Undergraduates Fall or spring. Credit to be arranged. S-U grades optional.

Division faculty.

For advanced, independent study by an individual student or for study on an experimental basis with a group of students in a field of nutritional sciences not otherwise provided through course work in the department or elsewhere at the University. Students prepare a multicopy description of the study they wish to undertake on forms available from the Counseling Office. This form must be signed by the

instructor directing the study and the associate director of academic affairs of the division and filed at course registration or within the change-of-registration period after registration. In order to ensure review before the close of the course registration or change-of-registration period, early submission of the Special Studies Form to the associate director for academic affairs is necessary.

400 Directed Readings For study that predominantly involves library research and independent reading.

401 Empirical Research For study that predominantly involves data collection and analysis or laboratory or studio projects.

402 Supervised Fieldwork For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

441 Nutrition and Disease Fall. 4 credits. S-U grades optional. Prerequisites: NS 331 and a human physiology course.
M W F 10:10 and W 7:30 p.m. J. Rivers.
Study of the physiologic and metabolic anomalies in chronic and acute illnesses and the principles of nutritional therapy and prevention. The topics covered are diabetes mellitus, starvation, obesity, nutritional assessment, nutritional pharmacology, severe injury, infection, cancer, gastrointestinal diseases, liver disorders, renal diseases, cardiovascular diseases, and pediatrics. Original research papers, books, review papers, and publications of professional organizations are used throughout the course. Handouts and purchased pamphlets, $5.

442 Diet Formulation and Analysis Fall. 2 credits. S-U grades optional. Limited enrollment. Prerequisites: NS 246, coregistration in NS 441 or equivalent background, and permission of the instructor.
M 2:30–4:15.
Development of skills in formulation and analysis of therapeutic dietary regimes. Various sources of information on food composition, diet planning, and enteral and parenteral nutrition supplements are used.

445 Community Nutrition and Health Spring. 3 credits. S-U grades optional. Prerequisites: NS 331 or permission of the instructor. NS 325 recommended.
Lec M W F 1:25; disc W 2:30–4:30. S. Kumanyika.
Study of human nutrition and health problems from a community perspective; programs and policies related to nutrition at local, state, and federal levels; approaches and techniques of effective application and dissemination of nutrition knowledge in communities.

446 Physiochemical Aspects of Food Fall. 3 credits. S-U grades optional. Prerequisite: NS 246 and a college course in biochemistry, which may be taken concurrently.
M W F 9:05. G. Armbruster.
The relation of food quality to (a) rheological properties of food systems, (b) oxidation and reduction reactions, and (c) enzymatic and nonenzymatic browning. Physical and chemical factors accounting for the color, flavor, and texture of natural and processed foods.

447 Physiochemical Aspects of Food—Laboratory Fall. 1 credit. S-U grades optional. Enrollment limited to 16. Prerequisite or concurrent registration: NS 446.
T 1:25–4:25. G. Armbruster.
Laboratory experiments designed to illustrate the effect of varying ingredients and treatment on the quality of food products. Objective testing methods are used to determine food quality characteristics.

448 Physiochemical Aspects of Food, Laboratory Fall. 1 credit. S-U grades optional. Enrollment limited to 16. Prerequisite or concurrent registration: NS 446.
R 1:25–4:25. G. Armbruster.
Laboratory experiments designed to illustrate (a) the physiochemical behavior of colloidal systems, (b) chemical reactions of some food components, and (c) effects of temperature, pH, moisture, inorganic salts, and enzymes on physiochemical changes in natural foods, food components, and food mixtures.

456 Experimental Foods Methods Spring. 3 credits. Enrollment limited to 16. Prerequisites: NS 446 and NS 448; a course in statistics recommended.
Lab T R 1:25–4:25. G. Armbruster.
Application of the scientific method in the design and performance of experimental food problems and in the interpretation and evaluation of results. Evaluation of the use of instruments, and chemical and sensory methods in the measurement of food properties. Independent laboratory problems.

457 National and International Food Economics Spring. 3 credits. S-U grades optional. Prerequisites: college course in economics and junior standing or permission of instructor.
M W F 9:05 E. Thorbecke.
Examination of individual components essential for an understanding of the U.S. and world food economies. Review of bioenergetic and economic principles of food production needed to explain the potential for food supplies. Consideration of nutritional, social, and economic factors that influence the consumption of major food groups. Examination and evaluation of the effectiveness of various food policies and programs in altering food consumption patterns. Analysis of the world food economy.

488 Applied Dietetics in Food Service Systems Fall or spring. 3 credits. Limited to 30 students per semester. S-U grades optional. Prerequisite or corequisite: NS 378, and permission of instructor before course registration.
Lec, M 8; lab, M–F 2:30–8 p.m. K. Woodruff.
Laboratory will be arranged through Cornell Dining. Students will gain experience in care and use of institutional equipment, job analysis, volume food production, applied sanitation, recipe development and evaluation, as well as other management skills required to operate a food service program.

498 Honors in Nutritional Sciences Spring. 1 credit. Open only to students admitted to the division honors program. Students may register in NS 499 concurrently.
R 2:30. Division faculty; coordinated by chairperson of the honors committee.
Informal presentation and discussion of current topics in food and nutrition in which all members participate. Written reports on topics discussed may be requested.

499 Honors Problem Fall and spring. Open only to students in the division honors program.
Hours to be arranged. Division faculty.
An independent literature, laboratory, or field investigation. Students should plan to spread the work over two semesters.

600 Special Problems for Graduate Students Fall or spring. Credit to be arranged. S-U grades optional.
Hours to be arranged. Division faculty.
For graduate students recommended by their chairperson and approved by the instructor in charge. Emphasis on independent, advanced work. Experience in research laboratories in the division may be arranged.

601–604 Advanced Nutrition Series A series of nutrition courses offered jointly by the Division of Nutritional Sciences and the Departments of Animal Science and Poultry Science. Prerequisites: courses in nutrition, physiology, and biochemistry, including intermediary metabolism; or with permission of instructor.

601 Proteins and Amino Acids in Nutrition (also An Sc 601) Fall. 3 credits. Prerequisites: courses in physiology, biochemistry, and nutrition or consent of the instructors.
M W F 11:15. R. E. Austic, M. Morrison.
Advanced course in amino acid and protein nutrition with emphasis on the dynamic aspects of protein digestion, amino acid absorption, protein synthesis, amino acid metabolism, and nitrogen excretion. Discussion will include nutritional interrelationships, amino acid and protein requirements, assessment of nutritional status, evaluation of protein quality, bioavailability of amino acids, and techniques of amino acid analyses. Emphasis is on basic principles and their application to animal and human nutrition.

602 Lipids Fall. 2 credits.
T R 11:15. A. Bensadoun.
Advanced course on biochemical, metabolic, and nutritional aspects of lipids. Emphasis is placed on critical analysis of current topics of lipid methodology; lipid absorption; lipoprotein secretion, structure, and catabolism; mechanisms of hormonal regulation of lipolysis and fatty acid synthesis; and cholesterol metabolism and atherosclerosis.

603 Nutritional Energetics Spring. 2 credits. Register in An Sc 603.
M W 10:10. J. T. Reid.

604 The Vitamins Fall. 2 credits. Register in An Sc 604.
T R 10:10. M. L. Scott and G. F. Combs, Jr.
Lectures on nutritional aspects of the vitamins, including recent developments in nutritional and biochemical interrelationships with other nutrients and metabolites.

606 Carbohydrate Chemistry Spring. 2 credits. S-U grades optional. Prerequisites: organic chemistry; biochemistry recommended.
T R 11:15. B. A. Lewis.
The chemistry and physiochemical properties of carbohydrates (including sugars), polysaccharides, and their complexes with lipids, proteins, and other food components. The functional role of the carbohydrates in food systems and their nutritional implications will be discussed as well as applications of carbohydrates in food processing.

611 Molecular Toxicology Fall. 2 credits. S-U grades optional. Prerequisite: full-year, 400-level course in biochemistry or equivalent. Offered alternate years.
T R 10:10. C. Campbell.
A study of fundamental biochemical mechanisms of absorption, transport, metabolism, and excretion of drugs, carcinogens, and toxicants. Emphasis on oxidative and conjugative pathways of metabolism and of environmental and nutritional factors that influence toxicant metabolism and disposition. Methods of evaluating *in vivo* and *in vitro* metabolism.

612 Methods of Assessing Physical Growth in Children Spring. 2 credits. S-U grades optional. Prerequisite: graduate standing or permission of instructor.
Lec, T 1:25; lab, T R 1:25–4:25. J. Haas.
A laboratory course to train students in methods and techniques used to assess the physical growth and development of growing children. The methods explored will be those which are applicable for field or community studies and will cover anthropometry, body composition, skeletal age, maturity indicators, physical fitness, and physiological responses to environmental stress.

616 Readings in Food Fall. 2 credits. S-U grades optional. Prerequisites: organic chemistry; biochemistry recommended.
Time to be arranged. N. Mondy.
Critical review of selected topics in the current literature. Emphasis on experimental data and basic scientific principles underlying modern theory and practice relative to food quality. May be repeated for credit with permission of instructor.

619 Field of Nutrition Seminar (also An Sc 619) Fall or spring. Noncredit. S-U grades only.
M 4:30.
Lectures on current research in nutrition presented by visitors and faculty.

621 General Nutrition Spring. 3 credits. Prerequisites: NS 331, Bio S 331, and Vet M 346. Students with equivalent course work may enroll with permission of instructor.
M W F 10:10. D. Roe.
The course is intended for graduate students with a major or minor in nutrition and undergraduate nutrition majors with the necessary background of course work. The aim is to present an in-depth treatment of nutritional science with human application. Subject matter will include historical perspectives, nutritional physiology, assessment of nutritional status, human nutritional requirements, and nutritional disease due to diet, disease, or drugs.

625 Seminar in Food Habits Research Fall. 3 credits. Limited to 12 graduate students. Prerequisites: statistics or research design course. Offered every other year.
W F 3:35. D. Sanjur.
Emphasis given to critical review of the literature and development of a research proposal using sociological theories and techniques as applied to nutritional data.

626 Special Topics in Food Spring. 2 credits.
Time to be arranged. G. Armbruster, E. E. Hester, B. A. Lewis.
Current research related to food will be reviewed in the context of basic principles and their application to the quality of food.

627 Special Topics in Food Spring. 2 credits. Prerequisites: organic chemistry; biochemistry recommended.
Time to be arranged. N. Mondy.
Current research related to food production and processing will be reviewed. May be repeated for credit with permission of instructor.

630–633 Advanced Nutrition Laboratory Spring. Limited to 12 students.
T R 2:15–5:15. Division faculty.
Study of the anthropometric, dietary, clinical, and biochemical assessment of human nutritional status. The individual courses are taught in sequence over the entire semester.

630 Anthropometric Assessment 1 credit. Prerequisites: NS 331 or equivalent and permission of instructor.
J. Haas.
Study of methods and procedures for anthropometric, radiographic, and energetic assessment of children and adults in clinical, research, and survey settings.

631 Dietary Assessment 1 credit. Prerequisites: statistics and NS 331 or equivalent and permission of instructor.
D. Sanjur.
Study of methods and techniques for assessing dietary intakes at the individual and household levels.

632 Clinical Assessment 1 credit. Prerequisites: NS 630, 631, 441; Bio S 330 or 331; and either NS 332 or Bio S 430; and permission of instructor.
V. Utermohlen and division faculty.
Study of methods and techniques for clinical assessment of nutritional status and diagnosis of nutritional disorders.

633 Biochemical Assessments 2 credits. Prerequisites: NS 331, Bio S 330 or Bio S 331, either NS 332 or Bio S 430 and a course in human physiology and permission of instructor.
M. Kazarinoff and division faculty.
Biochemical assessment of nutritional status. Experiments are selected to exemplify measurements of intake, use, and output of primary nutrients and their metabolites.

634 Vitamins and Coenzymes (also Bio S 634) Spring. 2 credits. Offered in alternate years. Prerequisites: organic chemistry 253 or 357–358, and Bio S 331 or 330 or their equivalents in biochemistry.
D. B. McCormick.
The chemical, biochemical, and nutritional aspects of the vitamins and coenzymes.

635 Metabolism and Enzyme Mechanisms (also Bio S 635) Spring. 2 credits, lectures only. Prerequisites: Chem 357–358 and either Bio S 330 or 331, or permission of the instructor. Physical chemistry suggested.
T R 9:05; discussions to be arranged. W. L. Dills and staff.
Lectures cover molecular mechanisms of metabolic regulation and mechanisms of enzyme-catalyzed reactions, including explicit enzyme function.

637 Epidemiology of Nutrition Fall. 2 credits. S-U grades optional. Limited to graduate students. Prerequisites: Stats 602 or 604 or equivalent; NS 331, 441, 601, 603, 630 and 631 or equivalent; and permission of instructor.
Time to be arranged. J. Habicht.
In the context of designing and evaluating population interventions to improve protein-calorie nutrition, students will (a) review past evidence of effectiveness and efficiency of interventions, (b) attempt to quantify sensitivity and specificity of outcome measures, and (c) design methods to improve interventions and evaluations.

638 Epidemiology of Nutrition Spring. 2 credits. S-U grades optional. Limited to graduate students. Prerequisites: Stats 602 or 604 or equivalent; NS 331, 441, 601, 603, 630 and 631 or equivalent; and permission of instructor.
Time to be arranged. J. Habicht.
In the context of designing national nutrition surveillance, students will review (a) principles underlying surveillance, (b) prerequisites of indicators, and (c) current surveillance proposals to identify strengths and weaknesses.

645 Seminar on U.S. Nutritional Services and Programs Fall. 2 credits. S-U grades optional. Limited to 12 graduate students with a major or minor in human nutrition.
T 2:30–4:30. S. Kumanyika and B. Hopkins.
Students will be guided in the study and discussion of U.S. food and nutrition programs, community settings for nutrition service delivery, and the linkages of these settings to acute care. Participants will be responsible for preparing and presenting relevant material in class. Guidance for discussion will be provided by appropriate faculty.

646 Seminar in Physiochemical Aspects of Food Spring. 3 credits. S-U grades optional. Prerequisite: a college course in organic chemistry or biochemistry.
T R 9:05, additional discussion period to be arranged. E. E. Hester.
An introduction to physiochemical aspects of food for graduate students who have had limited or no work in this area. The seminar uses the lectures of NS 246 as a basis for supplementary readings and critical review of research on selected topics.

650 Clinical and Public Health Nutrition Spring. 3 credits. Prerequisites: NS 331 or equivalent.
M W F 9:05. D. Roe.
For graduate students with a major or minor in nutrition and undergraduate nutrition majors in their senior year. Lectures will cover social, environmental, and disease variables that influence the nutrition of infants, children, and adults. Endemic nutritional problems (such as obesity, dental caries, and anemias) of public health importance in the United States will be discussed. Student presentations will be made in class.

651 Nutrition and the Chemical Environment Fall. 3 credits. Prerequisites: NS 331 or equivalent.
M W F 11:15. D. Roe.
The relationship between nutrition and the effects of foreign chemicals. Students are offered an overall view of compounds to which we are exposed, including natural food toxicants, food additives, water pollutants, pesticide residues, and radioactive wastes as well as medications and illegal drugs. A factual and scientific background is developed so students can interpret information and misinformation circulated in the news media.

652 Nutrition Counseling Spring. 2 credits. Open only to students in the Clinical Nutrition Program. Prerequisites: NS 441, 442, and permission of instructor.
T R 9:05–11.
Principles and procedures of nutritional counseling in clinical practice. Emphasis on subject matter and process skills necessary to develop, implement, and evaluate nutritional care plans for individuals and groups. Includes workshops, simulation techniques, and work with clients in selected settings.

659 The Nutrition and Physiology of Mineral Elements (also Vet M 759) Fall. 2 credits. Prerequisites: basic physiology, intermediate biochemistry, general nutrition.
T R 8. R. Wasserman, R. Schwartz, and D. Van Campen.
Lectures on nutritional aspects and physiological, biochemical, and hormonal relationships of the prominent macro- and micro-elements, with emphasis on recent developments. Included will be information on methodologies of mineral research and the chemistry of ions and complexes as well as essentiality, requirements, transport, function, homeostasis, interrelationship, and toxicity of various mineral elements.

660 Special Topics in Nutrition Fall and spring. 3 credits maximum each term. Registration by permission of the instructor.
Division faculty.
Designed for the student who wishes to become informed in any specific topic he or she selects that is related directly or indirectly to nutrition. The course may include individual tutorial study, experience in research laboratories, a lecture series on a special topic selected by a professor or a group of students, and/or selected lectures of a course already offered. Topics may be changed so that the course may be repeated for credit.

669 Field Seminar Spring. 1 credit. S-U grades only. Required for graduate students in clinical nutrition. Open to other graduate students in nutrition with permission of instructor. Limited to 12.
Immediately following final examinations spring semester. B. Hopkins and J. Rivers.
Overview of policy decision making and implementation of nutrition programs at the state and national levels. Seminars alternate between Washington, D.C. (even years) and Albany, N.Y. (odd years). Provides opportunities to meet and confer with staff members of selected governmental and

private agencies. Upon return to campus an integrated summary report is required prior to group discussion.

670 Clinical Field Studies Fall, spring, summer. Maximum of 15 credits. S-U grades only. Limited to graduate students in clinical nutrition. Prerequisites: NS 441, 442, 652, 630, 631, 632, and 633.
Full-time study at off-campus clinical sites.
M. Reed, J. Rivers, V. Utermohlen.
The delivery of nutritional care in hospitals, outpatient clinics, and community settings.

680 International Nutrition Problems, Policy, and Programs Fall. 3 credits. Prerequisite: permission of instructor.
T R 11:15–12:30. M. Latham.
Designed for graduate students who wish to learn about the important nutritional problems of developing countries. The major forms of malnutrition related to poverty and their underlying causes will be discussed. Emphasis will be placed on programs and policies that can assist poor countries and communities to improve their nutritional and health status.

690 Seminar in Nutrition and Behavior Spring. 3 credits. Registration by permission. S-U grades optional.
Hours to be arranged. D. Levitsky.
Selected topics include the effect of diet on the developing brain and its effect on behavior, physiological basis of feeding and drinking behavior, and control of obesity. Students should have at least one course in biopsychology, physiology, and nutrition.

695 Seminar in International Nutrition and Development Policy Spring. 2 credits. S-U grades optional. Prerequisite: NS 680 or equivalent.
T R 10:10–12. M. Latham and division faculty.
The role of nutrition in national development. Emphasis will be on the interdisciplinary nature of the programs and policies needed to solve the food and nutrition problems of low-income countries and communities. The planning of programs and the evaluation of alternate strategies designed to improve nutrition will be discussed, using examples from particular countries.

699 Special Topics in International Nutrition Fall. 2 credits. S-U grades optional.

703 Seminar in Nutritional Science Fall or spring. 1 credit. S-U grades only.
T 12:20 or W 12:20. Division faculty.

899 Master's Thesis and Research Fall or spring. Credit to be arranged. S-U grades optional. Registration with permission of the chairperson of the graduate committee and the instructor.
Hours to be arranged. Division graduate faculty.

999 Doctoral Thesis and Research Fall or spring. Credit to be arranged. S-U grades optional. Registration with permission of the chairperson of the graduate committee and the instructor.
Hours to be arranged. Division graduate faculty.

Officer Education

Aerospace Studies Courses

Freshman Year

161 United States Air Force Today I Fall. 1 credit.
1 class each week. A. J. Ferencak.
A study of current United States military forces with emphasis on the analysis of the doctrine, mission, and organization of the United States Air Force. Historical and current factors affecting today's professional military officers are considered. The elements of strategic offensive and defensive forces are explored also.

162 United States Air Force Today II Spring. 1 credit.
1 class each week. A. J. Ferencak.
The Aerospace Support Forces of the United States are studied, with emphasis on the mission, resources, and operations of tactical air forces throughout the world. Army and Navy operations and functions as contributions to the total national defense are reviewed.

Sophomore Year

211 Development of Air Power I Fall. 1 credit.
1 class each week. C. A. Houston.
Factors leading to the development of air power and the concepts and doctrine for the employment of air power are studied. Reviews the history of manned flight. Analyzes the effects of World War I on the employment of air power in World War II, including such topics as strategic bombing, tactical air power, and the role of air superiority in warfare.

212 Development of Air Power II Spring. 1 credit.
1 class each week. C. A. Houston.
The employment of the Air Force since World War II in military and nonmilitary operations to support national objectives. Review of the effects of technology on defense policy and strategy. Discussion of quasi-military employment of the air arm in such activities as the Berlin Airlift and national and international relief missions in Asia, Africa, and the Americas. The role of air power in the Korean conflict, the Cuban crisis, and the Vietnam War are examined from the viewpoint of technology and tactical doctrine.

Junior Year

331 Management and Leadership I Fall. 3 credits.
3 classes each week. R. F. Kozma.
Air Force leadership responsibilities at the junior officer level including the responsibility, authority, and function of the Air Force commander and staff are studied. Emphasizes management research and theory covering recent approaches to leadership models. Covers the function of the military law system as contained in the Uniform Code of Military Justice, emphasizing similarities and differences from civil law. Students use case study exercises and present oral and written reports.

332 Management and Leadership II Spring. 3 credits.
3 classes each week. R. F. Kozma.
Air Force management at the junior officer level is studied to provide an understanding of the basic concepts of management and the decision-making process. Management fundamentals including planning and organizing, coordinating, directing, and controlling are covered, with emphasis on the manager in the world of power and politics. Includes managerial strategy and tactics. Case studies relating to military situations are used, and oral and written reports are required.

Senior Year

461 American Defense Policy I Fall. 3 credits.
3 classes each week. G. Fisher.
Examines the functions and roles of the professional officer in a democratic society and how they relate to the socialization processes, prevailing public attitudes, and value orientations associated with professional military service. Throughout the course students make oral presentations on topics of contemporary military interest. Studies of the formulation of defense policy including political, economic, and social constraints. Explores the requisites for maintaining adequate national security forces and assesses the impact of technological and international developments upon strategic preparedness and the overall defense policymaking process.

462 American Defense Policy II Spring. 3 credits.
3 classes each week. G. Fisher.
An investigation of basic contemporary nuclear strategy, its evolution, control, and future. Alternatives to nuclear war including arms control, limited wars, wars of revolution, and insurgency are examined. Governmental processes and relationships that determine the contemporary military environment and provide a perspective for the future of defense policymaking in the United States are also discussed.

Elective Course

405 Principles of Air Navigation and Aircraft Systems Fall. 3 credits.
2 classes each week. Staff.
Basic principles of weather elements, aerodynamics, aircraft systems, engine systems, and navigation systems. These systems are integrated with chart projections, navigational aids, flight instruments, and avionics. Use of flight computer. Prepares student for F.A.A. Private Pilot Ground School Test.

Military Science Courses

Freshman Year (MS I)

101 United States Organization for Defense Fall. 1 credit. Required.
AROTC staff.
This course allows the student an opportunity to examine the United States defense apparatus in terms of organization, mission, personnel, and inter-relationships among military forces and between the military forces and various branches and departments of the government. The United States Army force structure is examined from the policymaking level in Washington to the role of the officer education programs on college and university campuses. The complexities and magnitude of operating the defense organization are dealt with, providing a framework for subsequent instruction.

Sophomore Year (MS II)

221 Mapping: Land Navigation Fall. 1 credit. Required.
AROTC staff.
The course provides the student with a practical knowledge of the various forms of topographic representation. The student develops, interprets, and utilizes maps in terrain association and land navigation. The student's knowledge of topography is complemented by an orientation on significant environmental influences from political, social, and climatic factors. Portions of the course emphasize practical experiences in land navigation and orienteering.

201 American Military History Fall. 1 credit. Optional.
AROTC staff.
The student is introduced to the origin and growth of the United States Army as an institution maintained by the nation to protect its interests, secure its way of life, and, when necessary, to implement foreign policy. The principles and theories of war are examined and their application illustrated by examples drawn from American military history. Also explored are the foreign and military policies of the United States and the basic causes that have led to the various conflicts in which the United States has participated.

231 Social and Organizational Psychology in the Military Environment Fall. 1 credit. Optional.
AROTC staff.
This course allows the student to develop a basic understanding and appreciation of the theories of social and organizational psychology and behavior as they apply to the military setting. Attention is given to leader types, the source and exercise of authority, and the impact of varying styles of leadership on motivation and organization effectiveness. The student is introduced to the concepts of integrity, ethics, and professionalism.

Junior Year (MS III)

332 Theory and Dynamics of the Military Team Fall. 2 credits. Required.
AROTC staff.
After an initial introduction to techniques of presenting briefings, the student is provided with a broad understanding of the principles, fundamentals, and applications of team concept of military organizations. Particular emphasis is given to leadership responsibilities of the commander as the team coordinator. Additionally, the student is given an opportunity to develop an understanding of the roles and contributions of the various branches of the Army in support of the military team.

332 Leadership in Small Unit Operations Spring. 2 credits. Required.
AROTC staff.
This course provides the student with an understanding of the nature of decision making and the tactical application of the military team. Through the use of conferences and extensive practical exercises, the student develops familiarity with the factors influencing the leader's decisions; the processes of planning, coordinating, and directing the operations of military units to include troop-leading procedures; and development of operation plans and orders.

Senior Year (MS IV)

424 Contemporary Military Environment I Fall. 2 credits. Required.
AROTC staff.
A detailed examination of the functions and activities of military organizations, their commanders, and their staff. Discussion focuses on students' past experiences and future expectations in examining such aspects of the military environment as the chain of command, decision making, command and staff relations actions, and the various elements of small unit administration.

461 Contemporary Military Environment II Spring. 2 credits. Required.
AROTC staff.
A continuation of Military Science 424. The student is provided with an opportunity to examine carefully the leadership environment of an Army officer. Conferences and seminars are used to examine the techniques of effective military leadership, the sociological and psychological environment of the present military, the nature of military law, and above all, the professional ethics, responsibilities, and obligations of an Army officer.

Naval Science Courses

Freshman Year

101 Fundamentals of Naval Science Fall. Noncredit.
One hour class each week (lecture-recitation). Navy staff.
A study of fundamental aspects of naval science, including its conceptional contributions to sea power, factors involved in the physical development of naval forces, resources which must be managed, and prospects for the future.

M&AE 101 Naval Ship Systems Spring. 3 credits.
3 classes each week (lecture-recitation). R. L. Wehe.
An introduction to primary ship systems and their inter-relationship. Basic principles of propulsion, control, internal communications, structure, and other marine systems are considered.

Sophomore Year

211 Armed Conflict and Society Fall. 3 credits.
3 classes each week. Presentation by Marine Corps and Navy instructors with guest lecturers, primarily from government and history departments.
A study of modern warfare that examines the relationship of military strategy to geography, economics, sociology, technology, and national political realities and values; the evolution of warfare, including principles of war, weapons and associated equipment, and the effects of nuclear weapons and guerrilla warfare on traditional concepts of national strategy.

201 Sea Power—Maritime Affairs Spring. 1 credit.
One seminar weekly. Navy staff.
The seminar discussions explore the meaning and modern applicability of sea power concepts, including such components as naval power, ocean science, ocean industry, ocean commerce, and international law.

Junior Year (Navy)

Ag En 305 Principles of Navigation Fall. 4 credits.
4 classes each week (lecture-recitation-project work).
The course covers coordinate systems, chart projections, navigational aids, instruments, compass observations, tides and currents, and soundings. It also includes celestial navigation, time, spherical trigonometry, motion of the stars and sun, star identification, position fixing, use of the nautical almanac, electronic navigation systems, and air navigation.

321 Naval Operations Spring. Noncredit.
One hour class each week. Times to be arranged. Navy staff.
The application of command and control principles and the integration of sensors and weapons systems in the conduct of naval operations. Visual and electronic communications methods, data systems employment, tactical disposition of forces, and fleet logistics support are studied. Topics in shiphandling are also discussed.

Senior Year (Navy)

451 Naval Weapons Systems Fall. 3 credits. Prerequisites: Mathematics 192 or 112 and Physics 208 or 214.
3 classes each week (lecture-recitation). M W F 8. Navy staff.
The principles and theories used in the development of naval weapons systems. Initially, extensive study is made of sensing and detection systems, especially radar and sonar, followed by discussions of ancillary systems for computing, tracking, stability, and weapons control and delivery. The latter part of the course covers the formal derivation of the fire control problem and development of an algorithmic solution method applicable to the digital computer. Emphasis is on the solution of computational problems in assignments and examinations.

431 Naval Leadership, Organization, and Management Spring. Noncredit.
W or R 1:25–4:15 p.m. (seminar given simultaneously with Naval Science 442). Navy staff.
Principles and functions of management relevant to the naval environment and the structure of the naval organization. Theories and research of the behavioral sciences pertinent to the leadership role of the junior officer in the Navy or Marine Corps are explored, with particular emphasis on self-development and individual responsibility. Through the use of assigned readings, experiential exercises, situation problems, and case studies, students interact with peers to develop their individual leadership style. Members of the class take part in a team project based upon an actual leadership situation.

Junior or Senior Year (Marines)

311 Amphibious Warfare Spring. 3 credits.
3 classes each week (lecture-recitations). Times to be arranged. Marine Corps staff.
The history of the development, theory, techniques, and conduct of amphibious operations during the twentieth century. Special emphasis is placed on amphibious operations conducted in the Central Pacific during World War II.

Physical Education

Enrollment is limited by the number of places in each class and the locker space available; other restrictions are included in the course descriptions. Men and women may register for any course listed below (with the exception of the swimming course offered at Teagle Hall).

The time and place of class meetings are available at physical education registration at the beginning of each semester. Courses offered "fall" or "spring" begin the third week of the semester and continue through the last week of academic instruction. Courses offered "fall I," "fall II," "spring I" or "spring II" are given in six-week units.

Physical Education Courses Offered at Teagle Hall

Team Sports

Badminton Fall and spring.
Two classes each week.
Beginning and intermediate levels.

Volleyball Fall and spring.
Two classes each week.
Beginning and intermediate levels. Fundamentals and team play are stressed.

Individual Sports

Advanced Rock Climbing Fall and spring.
Prerequisite: Basic Mountaineering or permission of instructor.
Hours to be arranged.

Archery Fall and spring. Offered at Helen Newman Hall.

Basic Mountaineering Fall and spring. Fee charged for equipment, travel, and incidentals. Instruction in fundamentals and practical experience in outdoor survival, basic mountaineering, and related subjects.

Bowling Fall and spring. Offered at Helen Newman Hall.

Dance Programs Fall and spring. Offered at Helen Newman Hall.

Equitation Fall and spring. Fee charged.

Fencing Fall and spring. Fee charged.
Two classes each week.
Beginners are provided with all necessary equipment.

First Aid Fall and spring.
One class each week.
American Red Cross Standard First Aid course.

Golf

Instructional Golf Fall and spring. Fee charged. Instruction by P.G.A. professionals. Teaching geared to all levels. Equipment furnished.

Recreational Golf Fall and spring. Limited to students with golfing experience. Fee charged.
Nine holes twice a week for six weeks.
Students must provide their own clubs.

Hunter Safety Spring.
Hours to be arranged.
Instruction in hunter safety leads to New York State hunter certification in archery or bow and gun.

Ice Craft (Climbing) Spring. Limited to students experienced in mountain climbing. Prerequisite: permission of instructor.
Hours to be arranged.

Indoor Tennis Spring. Fee charged.
Hours to be arranged.
Tennis instruction at Advantage Indoor Tennis courts. Transportation and equipment are provided.

Jogging Fall and spring.
Two classes each week.
Students develop the capacity to run three miles.

Judo and Karate

Judo Fall and spring. Fee charged.
Two classes each week.
Beginning course with professional instruction. Ghi provided.

Karate Fall and spring. Fee charged.
Two classes each week.
Beginning course with professional instruction. Ghi provided.

Students interested in judo or karate at the intermediate and advanced level should join the Judo Club or the Karate Club and register in evening classes. Information about clubs is available at the Physical Education Office, Teagle Hall.

Nautilus Fall and spring. Enrollment limited. Fee charged.
Two classes each week.
Advanced weight lifting on specifically designed apparatus.

Outdoor Leadership Training — Introductory Back Packing Fall and spring. Fee charged.
Instruction includes basic back packing skills; emergency equipment repairs, safety consciousness and accident prevention, first aid, trip planning, route selection, orienteering, minimum impact camping, and other topics.

Racketball Fall and spring.
Two classes each week.
Instruction at all levels. Equipment is furnished.

Recreational Games Fall and spring.
Two classes each week.
A survey of low-skill group games that may be used for camp, school, or recreational groups.

Riflery Fall and spring. Fee charged. Offered at Helen Newman Hall.

Introduction to Scuba Diving Fall and spring. Fee charged.
Two classes each week.
Beginning course — general certification only. All equipment is provided, including tanks, regulator, snorkel, and vest.

Skating Fall and spring. Fee charged.
Three classes each week.
For beginning or intermediate skaters. Students provide their own skates (hockey skates) or rent skates.

Skeet and Trap Fall and spring. Fee charged.
Beginning course includes lectures and shooting at the Tompkins County Rod and Gun Club range. Guns and shells are furnished.

Skiing Spring. Fee charged. For registration or more information report to the Physical Education Office in Teagle Hall.

Squash Fall and spring. Fee charged.
Two classes each week.
Beginning course.

Swimming Fall and spring. Enrollment limited to men.
Instruction in beginning (survival) swimming for nonswimmers.

Tennis and Volleyball Fall and spring.
Volleyball in the Teagle Gym and tennis on Upper Alumni Field Courts.
Beginning class emphasizes fundamentals in each sport. Racquet and ball are provided.

Water Safety Courses

Advanced Life Saving Fall and spring.
One class each week.
Students should be in good physical condition.

ARC Water Safety Instructors Course Spring.
Prerequisite: advanced life saving certification. Classes start in late March and are held until the course is completed (approximately 32 hours).

WSI Refresher Course Spring. Prerequisite: current WSI certification. Students should come prepared to be tested for required swimming skills and physical endurance.

Weight Control Fall and spring. Fee charged.
One lecture each week and supervised jogging periods.

Weight Lifting Fall and spring.
Two classes each week.
Beginning and intermediate classes include instruction in correct lifting techniques. Each student will be assigned a series of exercises designed for his or her individual needs.

Winter Camping Spring. Prerequisite: camping or mountaineering experience. Fee charged. Further information is available at registration.

Physical Education Courses Offered at Helen Newman Hall

Team Sports

Basketball Fall II and spring I.
Two classes each week.
Beginning — Instruction and practice in the basic skills of passing, catching, dribbling, shooting, defense and offense, rules and strategy.
Intermediate — Emphasis on and practice of shooting skills, alternate offenses and defenses, advanced team strategy.

Field Hockey Fall I.
Two classes each week.
Instruction and practice of basic hockey skills: dribbling, passing, dodging, tackling, team play, and strategy.

Lacrosse Fall I and spring II.
Two classes each week.
Instruction and practice of basic skills (cradle, passing, catching, goal shooting, checking) and team play and strategy.

Soccer Fall I.
Two classes each week.
Introduction to the game of soccer. This includes basic individual skills (passing, trapping, volleying) and team play and strategy.

Softball Spring II.
Two classes each week.
Instruction in regulation softball play. Batting, pitching, and fielding skills are also emphasized.

Volleyball Fall I, fall II, spring I, and spring II.
Two classes each week.
Beginning — Presentation and practice of basic skills: serving (underhand, sidearm, overhead), volley, underhand pass, bumping, spiking, blocking, rules and scoring.

Intermediate — Emphasis on accuracy and consistency. Skills taught include spiking and blocking, overhead serves, various methods of team play and court coverage, the dink, Japanese roll, and other advanced techniques.

Volleyball Fall and spring. Offered at Teagle Hall.

Individual Sports

Archery Fall I and spring II.
Two classes each week.
Beginning — Instruction in the care of equipment, seven basic steps for shooting, scoring, and practice shooting at 20, 30, and 40 yards.
Intermediate — Review of basic skills followed by instruction in intermediate shooting skills; clout shooting.

Badminton Fall II and spring I.
Two classes each week.
Beginning — Instruction and practice in rules, doubles play, strategy, and basic skills, including clearing, serving, drop shots, smash. Class competition.
Intermediate — Review of basic skills followed by instruction in strategy for doubles; presentation of intermediate shots and skills; drive serve, around-the-head, cross court shots, advanced systems of play, class competition.

Badminton Fall and spring. Offered at Teagle Hall.

Basic Mountaineering Fall and spring. Offered at Teagle Hall.

Bowling Fall and spring. Fee for each class (students bowl two lines; shoe rental included), $1.45.
Two classes each week.
Instruction in spot bowling techniques, use of the hook ball delivery, scoring, and converting spares.

Conditioning Fall I, fall II, spring I, and spring II.
Two classes each week.
Vigorous exercise is performed to condition and stress the cardiovascular and respiratory systems. Entails running and exercising at various levels of intensity to increase endurance, strength, and flexibility.

Cycling Spring II.
One class each week.
Includes basic instruction in bike care. Students tour the Ithaca area during classes and must provide their own bicycle.

Dance
Two classes each week.
Classes in dance technique are intended to develop strength, flexibility, coordination, and the ability to perceive and reproduce phrases of dance movement with rhythmic accuracy and clarity of body design. The more advanced classes require mental and physical ability to perform more complex phrases in various styles.

The courses listed below are offered both fall and spring.

Modern Dance: Dance Fundamentals
Elementary Modern
Intermediate Modern
Advanced Modern
Dance Composition
T'ai Chi
Ballet I
Ballet I+
Ballet II

Ballroom Dance Fall and spring.
Two classes each week.
Instruction in social or ballroom dancing. Dances include the waltz, Charleston, rhumba, calypso, tango, and variations.

Folk Dance Fall and spring.
Two classes each week.
Introduction to basic folk dance steps and dances of many countries.

Equitation Fall and spring. Class days and hours assigned at registration. Fee, $70.
One class each week.

Exercise and Figure Control Fall I, fall II, spring I, and spring II.
Two classes each week.
Exercise and discussion sessions introduce the purpose of each exercise, the ways in which exercise may be used in weight control, the relationship of dieting and energy expenditure to weight control, design of an individual exercise program and participation in vigorous exercise and running.

Fencing Fall and spring. Equipment is furnished. Fee, $10.
Two classes each week.
Beginning — Introduction and practice of basic attacks and defenses in foil fencing. Conditioning and bouting in class competition.
Intermediate — Instruction and practice of advanced attacks and defenses in foil fencing. Bouting in class competition.

Fencing Fall and spring. Offered at Teagle Hall.

Figure Skating Fall II and spring I. Students must provide their own skates. Fee, $2.50.
Two classes each week.
Beginning — Instruction and practice in figure skating techniques: forward and backward crossovers, turns, spirals.
Intermediate — Review of basics followed by instruction and practice in intermediate techniques, including: lunge, jumps, spins.

First Aid Fall and spring.
One class each week.
American Red Cross Standard First Aid Course.

Gymnastics

Gymnastics I Fall I and spring I.
Two classes each week.
Basic instruction for tumbling, dance for gymnastics, balance beam, and trampoline.

Gymnastics II Fall II and spring II.
Two classes each week.
Basic instruction for uneven parallel bars, vaulting, and trampoline.

Intermediate Gymnastics Fall and spring.
Prerequisites: Gymnastics I and II or equivalent, or permission of the instructor.
Two classes each week.

Jogging Fall and spring.
Two classes each week.
A program to meet the needs of each individual. Progress from jogging a few hundred yards to a capacity of 3 miles at the end of twelve weeks.

Judo Fall and spring. Fee, $30.
Two classes each week.
Beginning course with professional instruction. Ghi provided.

Karate Fall and spring. Fee, $30.
Two classes each week.
Beginning course with professional instruction. Ghi provided.

Those interested in judo and karate at the intermediate and advanced level may join the Judo Club or the Karate Club. Information about the clubs is available at the Physical Education Office, Teagle Hall.

Outdoor Leadership Training — Introductory Back Packing Fall and spring. Fee, $15.
One class each week.
Instruction includes basic back packing skills, emergency equipment repairs, safety consciousness and prevention, first aid, trip planning, route selection, orienteering, minimum impact camping, and other topics.

Physical Fitness and Conditioning Fall and spring. Prerequisite: a medical examination by each individual's personal physician.
Two classes each week.
A scientifically managed exercise program for faculty, staff, students, and alumni.

Riflery Fall and spring. Fee, $10.
Two classes each week.
Instruction and practice in the techniques of target riflery from various shooting positions.

Skating Fall and spring. Fee, $5; skate rental, 75¢ for each class.
Three classes each week.
For beginning or intermediate skaters. Students provide their own skates (hockey skates) or rent skates.

Skeet and Trap Fall and spring.
One class each week.
Beginning course includes lectures and shooting at the Tompkins County Rod and Gun Club. Guns and shells are furnished.

Skiing

Ski Conditioning Fall II.
Two classes each week.
A variety of indoor and outdoor exercises designed to increase flexibility, strength, and endurance in preparation for the ski season.

Downhill Skiing Spring.
Further information is available at registration.

Cross-Country Skiing Spring I. Intended for both beginners and advanced skiers. Fee, $15.
One class each week.
In the first few lessons the basic ski touring techniques are taught. Main emphasis is on touring. Lectures cover waxing and choosing proper skiing equipment.

Squash Fall and spring. Fee, $7.
Two classes each week.
Beginning course.

Swimming

Beginning Swimming Fall I, fall II, spring I, and spring II.
Two classes each week.
Instruction and practice in basic skills leading to passing the swimming proficiency test.

Intermediate Swimming Fall I, fall II, spring I, and spring II.
Two classes each week.
Practice and perfection of basic skills and five basic strokes.

Advanced Swimming Fall I, fall II, spring I, and spring II.
Two classes each week.
Practice and perfection of the eleven basic strokes.

Beginning Synchronized Swimming Fall.
One class each week.
Sculling; stunts, including the tub, marlin, log roll, front and back tuck somersaults, and front and back pikes.

Diving Fall II.
Two classes each week.
Instruction in the fundamentals of competitive diving. Dives include front (pike and layout), back, front and back somersault.

Scuba—National Certification Fall and spring.
Fee, $85.
One class each week.
Basic scuba program includes classroom discussions, skill training in the pool, and open water training in Cayuga Lake. Internationally recognized basic certification.

Senior Life Saving Fall and spring.
Two classes each week.
American Red Cross Senior Life Saving instruction. Practice and execution of survival skills and life saving skills.

Water Safety Instructor Training Fall and spring.
Two classes each week.
Work toward American Red Cross WSI Certificate. Instruction in methods of teaching swimming strokes and lifesaving skills.

Tennis

Beginning Tennis Fall I and spring II.
Two classes each week.
Instruction and practice of the basic skills involved in playing tennis. Skills covered: grips and basic strokes, forehand, backhand, serve, footwork; team play for doubles and scoring.

Low Intermediate Tennis Fall I and spring II.
Two classes each week.
Review and further instruction in strokes, backhand and forehand, serve, volley, lob. Doubles strategy and play.

High Intermediate and Advanced Tennis Fall I and spring II. Fee, $2.50.
Two classes each week.
Skills emphasized: backhand, volley, serve (flat, slice, twist), approach shot, lob, smash. Advanced strategy for singles and doubles play. Students provide their own racquets.

Tennis and Volleyball Fall and spring. Offered at Teagle Hall.

Trampoline Fall and spring.
Two classes each week.
Beginning and intermediate skills taught, including swivel hips, front and back drops, flips, barani, combinations, and routines.

Weight Lifting Fall and spring. Offered at Teagle Hall.

New York State College of Veterinary Medicine

Anatomy

500 Gross Anatomy Fall.

501 Gross Anatomy Spring.

502 Developmental and Microscopic Anatomy Fall.

503 Microscopic Anatomy Spring.

504 Neuroanatomy Spring.

505 Applied Anatomy Fall.

506 Applied Anatomy Spring.

600 Special Projects in Anatomy Fall and spring.

601 Advanced Anatomy Fall and spring.

602 Advanced Clinical Neurology Spring.

700 Vertebrate Morphology Spring.

Avian and Aquatic Animal Medicine

255 Poultry Hygiene and Disease Fall.

555 Avian Diseases Spring.

671 Diseases of Aquatic Animals Spring.

673 Diseases of Aquarium Fish Spring.

770 Advanced Work in Avian Diseases Fall and spring.

771 Graduate Seminar in Diseases of Aquatic Animals Spring.

772 Advanced Work in Aquatic Animal Diseases Spring.

Clinical Sciences

475 Health and Diseases of Animals Spring.

560 Clinical Methods Fall.

561 Obstetrics and Reproductive Diseases Spring.

562 Obstetrics and Reproductive Diseases Fall.

563 Large Animal Medicine Fall.

564 Large Animal Medicine Spring.

565 Large Animal Surgery Spring.

566 Radiology Spring.

567 Clinical Nutrition Spring.

568 Veterinary Medical Orientation Fall.

569 Veterinary Medical Orientation Spring.

571 Clinical Pathology Fall.

572 Senior Seminar Fall and spring.

573 Large Animal Clinic Fall.

574 Large Animal Surgical Clinic Spring.

575 Ambulatory Clinic Fall.

576 Ambulatory/Mastitis Clinic Spring.

577 Ancillary Clinics Fall.

578 Anesthesia Spring.

579 General Medicine Spring.

580 Comparative Radiology Spring.

581 Basic Nutrition Fall.

582 Large Animal Surgical Techniques Spring.

583 Small Animal Medicine and Surgery Fall.

584 Small Animal Medicine and Surgery Spring.

586 Small Animal Surgical Exercises Spring.

587 General Surgery Fall.

589 Small Animal Medical Clinic Fall.

590 Small Animal Medical Clinic Spring.

591 Small Animal Surgical Clinic Fall.

592 Small Animal Surgical Clinic Spring.

593 Ophthalmology Spring.

594 Large Animal Medical Clinic Spring.

596 Opportunities in Veterinary Medicine Spring.

598 Dermatology Clinic Spring.

675 Special Problems in Large Animal Medicine Fall and spring.

676 Special Problems in Large Animal Surgery Fall and spring.

677 Special Problems in Large Animal Obstetrics Fall and spring.

680 Poisonous Plants Fall.

681 Horse Health Management Spring.

682 Large Animal Internal Medicine Fall.

684 Horse Lameness Spring.

686 Goats: Management and Diseases Spring.

688 Special Problems in Small Animal Medicine Fall and spring.

689 Special Problems in Small Animal Surgery Fall and spring.

690 Veterinary Dermatology Fall.

778 Gastroenterology Conference Fall and spring.

779 Veterinary Gastroenterology Spring.

780 Veterinary Research Methods Spring.

781 Advanced Work Fall and spring.

Microbiology

315 Basic Immunology Lectures Fall.

316 Basic Immunology Laboratory Fall.

317 Pathogenic Microbiology Spring.

515 Veterinary Immunology Fall.

516 Veterinary Bacteriology Fall.

517 Veterinary Virology Spring.

518 Veterinary Mycology and Protozoology Fall.

519 Infectious and Zoonotic Diseases Spring.

520 Community Health Spring.

545 Principles of Epidemiology Spring.

605 Special Projects in Microbiology Fall and spring.

606 Small Animal Infectious Diseases Spring.

707 Advanced Work in Bacteriology, Virology, or Immunology Fall and spring.

708 Advanced Animal Virology Lectures Spring.

709 Advanced Animal Virology Laboratory Spring.

710 Microbiology and Pathology Seminar Fall and spring.

711 Laboratory Methods of Diagnosis Fall and spring.

713 Seminars on Current Topics in Immunology and Microbiology Fall, spring, and summer.

Pathology

330 Introductory Parasitology and Symbiology Spring.

440 Parasitic Helminthology Spring.

535 General Pathology Fall.

536 Veterinary Pathology II Spring.

537 Veterinary Parasitology Fall.

539 Introduction to Laboratory Animal Medicine Fall.

540 Clinical Pathology Spring.

541 Comparative Necropsy Spring.

635 Special Problems in Pathology Fall and spring.

636 Wildlife Pathology Fall.

637 Postmortem Pathology Fall.

638 Microscopy Fall.

639 Special Topics in Lab Animal Medicine Fall.

640 Principles of Toxicological Pathology Fall.

735 "State of the Arts" Seminar Fall.

736 Pathology of Nutritional Diseases Spring.

737 Advanced Work in Animal Parasitology Spring.

738 "The Bottom Line" Fall.

739 Advanced Work in Pathology Fall.

740 Reproductive Pathology Spring.

745 Diseases of Nonhuman Primates Spring.

746 Comparative Pathology Spring.

749 Laboratory Animal Clinical Rotation Fall and spring.

788 Seminar in Surgical Pathology Fall and spring.

789 Seminar in Necropsy Pathology Fall and spring.

790 Special Topics in Pathology Fall and spring.

791 Mechanisms of Disease Spring.

Physical Biology/Section of Physiology

Invertebrate Zoology (Biological Sciences 310)

Histology: The Biology of the Tissues (Biological Sciences 313)

346 Introductory Animal Physiology Lectures (also Biological Sciences 311) Fall.

348 Introductory Animal Physiology Lab (also Biological Sciences 319) Fall.

Seminar in Anatomy and Physiology (Biological Sciences 410)

General Animal Physiology; A Quantitative Approach, Lectures (Biological Sciences 416)

General Animal Physiology, Laboratory (Biological Sciences 418)

Undergraduate Research in Animal Physiology and Anatomy (Biological Sciences 419)

550 Applied Radiation Biology and Veterinary Nuclear Medicine Fall.

600 Graduate Research in Animal Physiology and Anatomy (also Biological Sciences 719) Fall and spring.

Lipids (Biological Sciences 619 and Nutritional Sciences 602)

650 Special Projects in Physical Biology Fall.

652 Applied Electrophysiology Spring.

653 Clinical and Research Techniques in Veterinary Nuclear Medicine Fall.

Mammalian Physiology, Lectures (Biological Sciences 654)

Mammalian Physiology, Laboratory (Biological Sciences 656)

Physiological Optics (Biological Sciences 695)

750 Radioisotopes in Biological Research (also Biological Sciences 616) Spring.

752 Biological Membranes and Nutrient Transfer (also Biological Sciences 618) Spring.

755 Physical Biology Graduate Seminar Fall and spring.

758 Molecular Mechanisms of Hormone Action (also Biological Sciences 658) Spring.

759 Mineral Metabolism (also Biological Sciences 615 and Nutritional Sciences 659) Fall.

Physiology, Biochemistry, and Pharmacology

525 Vertebrate Biochemistry Fall.

526 Physiology for Veterinary Students Spring.

527 Physiology for Veterinary Students Fall.

528 Basic Pharmacology Spring.

529 Clinical Pharmacology Fall.

620 Special Projects in Physiology Fall and spring.

621 Toxicology Spring.

622 Special Projects in Pharmacology Fall and spring.

626 Veterinary Animal Behavior Spring.

720 Special Problems in Physiology Fall and spring.

721 Research Fall and spring.

722 Methods in Gastroenterological Research Spring.

724 Physiologic Disposition of Drugs and Poisons Spring.

725 Vertebrate Biochemistry Lectures Fall.

726 Physiology Spring.

727 Physiology Fall.

Preventive Medicine

660 Safety Evaluation in Public Health Spring.

661 Data Processing in Preventive Medicine Spring.

662 Advanced Epidemiology Spring.

Index

List of Announcements

Following is a list of *Announcements* published by Cornell University to provide information on programs, faculty, facilities, curricula, and courses of various academic units.

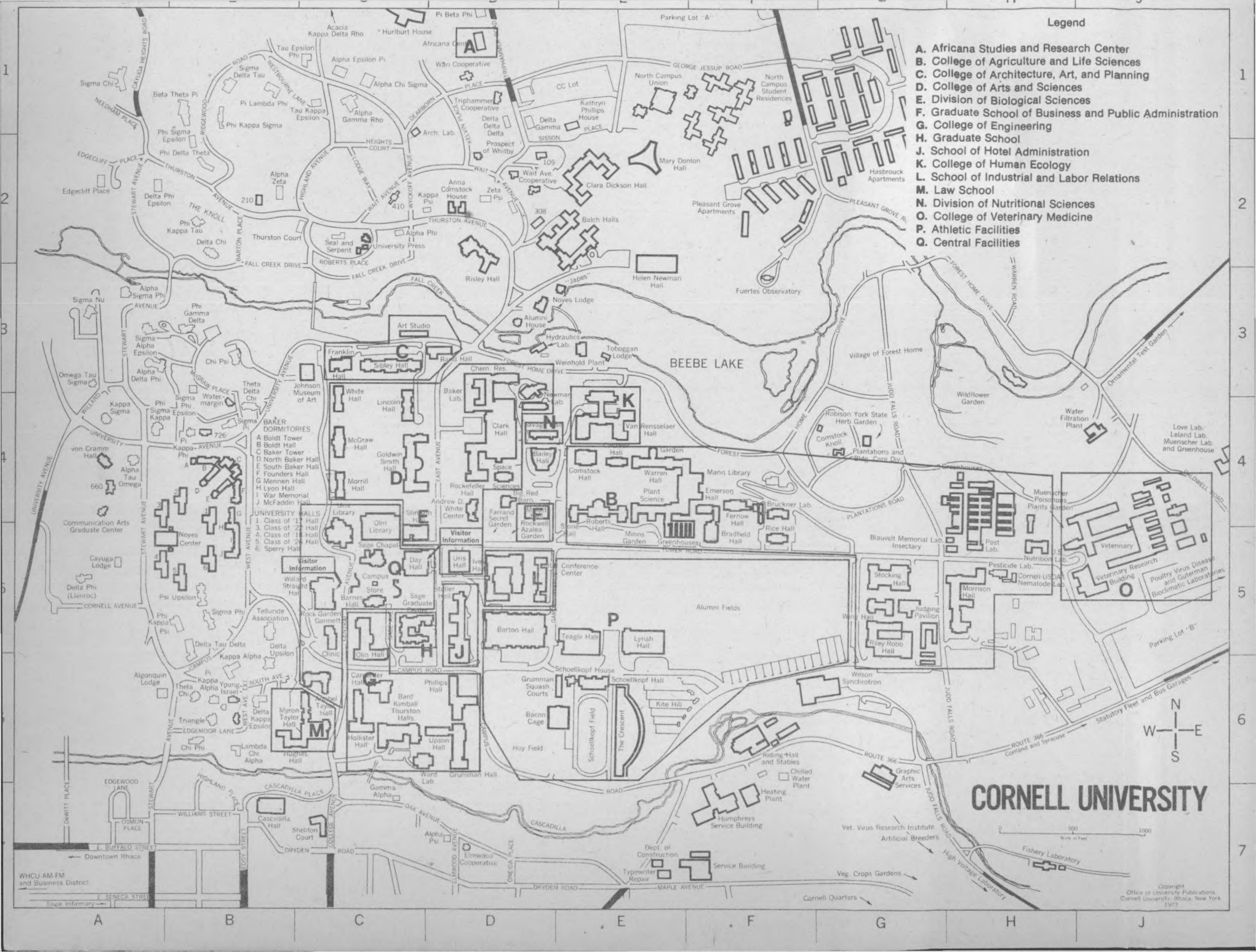
Agriculture and Life Sciences
College of Architecture, Art, and Planning
College of Arts and Sciences
Graduate School of Business and Public Administration
Engineering at Cornell
Graduate Study in Engineering and Applied Science
General Information*
Graduate School
School of Hotel Administration
College of Human Ecology
School of Industrial and Labor Relations:
ILR at Cornell
Graduate Study at ILR
Law School
Medical College (New York City)
Graduate School of Medical Sciences (New York City)
Officer Education (ROTC)
Summer Session
New York State College of Veterinary Medicine

*The *Announcement of General Information* is designed to give prospective students pertinent information about all aspects and academic units of the University.

In addition to the *Announcements* listed above, the University publishes a master catalog of University courses, *Cornell University: Description of Courses*, and a handbook for enrolled students, *Academic Information*.

Requests for the publications listed above should be addressed to
Cornell University Announcements
Building 7, Research Park
Ithaca, New York 14850.

(The writer should include a zip code.)


Legend
A. Africana Studies and Research Center
B. College of Agriculture and Life Sciences
C. College of Architecture, Art, and Planning
D. College of Arts and Sciences
E. Division of Biological Sciences
F. Graduate School of Business and Public Administration
G. College of Engineering
H. Graduate School
J. School of Hotel Administration
K. College of Human Ecology
L. School of Industrial and Labor Relations
M. Law School
N. Division of Nutritional Sciences
O. College of Veterinary Medicine
P. Athletic Facilities
Q. Central Facilities
CORNELL UNIVERSITY
BEEBE LAKE
Pi Beta Phi
Acacia
Kappa Delta Rho
Hurlburt House
Africana Center
A
Wäri Cooperative
Tau Epsilon Phi
Alpha Epsilon Pi
Sigma Chi
Sigma Delta Tau
Alpha Chi Sigma
Beta Theta Pi
Pi Lambda Phi
Tau Kappa Epsilon
Alpha Gamma Rho
Triphammer Cooperative
Phi Sigma Epsilon
Phi Kappa Sigma
Arch. Lab.
Delta Delta Delta
Prospect of Whitby
Phi Delta Theta
Alpha Zeta
Anna Comstock House
Kappa Psi
Zeta Psi
Ware Ave. Cooperative
Edgecliff Place
Delta Phi Epsilon
Phi Kappa Tau
Delta Chi
Thurston Court
Seal and Serpent
University Press
Alpha Phi
Risley Hall
Balch Halls
Helen Newman Hall
Fuertes Observatory
Noyes Lodge
Alumni House
Hydraulics Lab.
Toboggan Lodge
Weinhold Plant
Art Studio
Franklin Hall
Sibley Hall
Rand Hall
Chem. Res.
Johnson Museum of Art
Sigma Nu
Alpha Sigma Phi
Phi Gamma Delta
Sigma Alpha Epsilon
Chi Psi
Omega Tau Sigma
Alpha Delta Phi
Theta Delta Chi
Kappa Sigma
Phi Sigma Kappa
Water-margin
BAKER DORMITORIES
A Boldt Tower
B Boldt Hall
C Baker Tower
D North Baker Hall
E South Baker Hall
F Founders Hall
G Mennen Hall
H Lyon Hall
I War Memorial
J McFaddin Hall
UNIVERSITY HALLS
1. Class of '17 Hall
3. Class of '22 Hall
4. Class of '18 Hall
5. Class of '26 Hall
6. Sperry Hall
von Cramm Hall
Alpha Tau Omega
Communication Arts Graduate Center
Noyes Center
Cayuga Lodge
Delta Phi (Lienroc)
Psi Upsilon
Sigma Phi
Phi Kappa Psi
Telluride Association
Delta Tau Delta
Delta Upsilon
Kappa Alpha
Algonquin Lodge
Pi Kappa Alpha
Young Israel
Theta Chi
Triangle
Delta Kappa Epsilon
Chi Phi
Lambda Chi Alpha
Myron Taylor Hall
Hughes Hall
Edgewood Lane
Osmun Place
E. Buffalo Street
Downtown Ithaca
WHCU-AM-FM and Business District
E. Seneca Street
Sage Infirmary
Cascadilla Hall
Sheldon Court
Dryden Road
Elmwood Cooperative
Alpha Psi
Gamma Alpha
Ward Lab.
Grumman Hall
Baker Lab.
Clark Hall
Newman Lab.
Cayuga Hall
Bailey Hall
Lincoln Hall
White Hall
McGraw Hall
Goldwin Smith Hall
Morrill Hall
Rockefeller Hall
Andrew D. White Center
Farrand Secret Garden
Big Red Barn
Rockwell Azalea Garden
Olin Library
Uris Library
Stimson Hall
Visitor Information
Sage Chapel
Day Hall
Uris Hall
Willard Straight Hall
Campus Store
Barnes Hall
Sage Graduate Center
Rock Garden
Garnett
Clinic
Olin Hall
Carpenter Hall
Phillips Hall
Bard
Kimball
Thurston
Halls
Mollister Hall
Upson Hall
Taylor Hall
Conference Center
Alumni Fields
Barton Hall
Teagle Hall
Lynah Hall
Schoellkopf House
Schoellkopf Hall
Grumman Squash Courts
Bacon Cage
Hoy Field
Schoellkopf Field
The Crescent
Kite Hill
Comstock Hall
Warren Hall
Mann Library
Emerson Hall
Plant Science
Roberts Hall
Stone Hall
Minns Garden
Greenhouses
Fernow Hall
Bradfield Hall
Bruckner Lab.
Rice Hall
Blauvelt Memorial Lab. Insectary
Tower Road
Plantations Road
Forest Home Drive
Mary Donlon Hall
Clara Dickson Hall
Hasbrouck Apartments
Pleasant Grove Apartments
North Campus Union
North Campus Student Residences
George Jessup Road
CC Lot
Parking Lot "A"
Kathryn Phillips House
Delta Gamma
Sisson Place
Thurston Avenue
Wait Avenue
Highland Avenue
Lodge Way
Wyckoff Avenue
Heights Court
Dearborn Place
Westbourne Lane
Needham Place
Edgecliff Place
Thurston Avenue
Stewart Avenue
Barton Place
Fall Creek Drive
Roberts Place
Fall Creek
Cayuga Heights Road
Ridgewood Road
Willard Way
McGraw Place
University Avenue
Campus Road
Tower Road
Judd Falls Road
Forest Home Drive
Warren Road
Caldwell Road
Pleasant Grove Rd.
Village of Forest Home
Wildflower Garden
Ornamental Tree Garden
Water Filtration Plant
Robison York State Herb Garden
Comstock Knoll
Plantations and Bldg. Care Div.
Greenhouses
Love Lab.
Leland Lab.
Muenscher Lab.
and Greenhouse
Muenscher Poisonous Plants Garden
Veterinary
Veterinary Research Building
Poultry Virus Disease and Guterman Bioclimatic Laboratories
Pesticide Lab.
Cornell USDA Nematode Lab.
Nutrition Lab.
Morrison Hall
Stocking Hall
Judging Pavilion
Wing Hall
Riley-Robb Hall
Parking Lot "B"
Wilson Synchrotron
Statutory Fleet and Bus Garages
Route 366 Cortland and Syracuse
Riding Hall and Stables
Chilled Water Plant
Graphic Arts Services
Heating Plant
Humphreys Service Building
Vet. Virus Research Institute
Artificial Breeders
Fishery Laboratory
High Voltage Laboratory
Dept. of Construction
Typewriter Repair
Service Building
Veg. Crops Gardens
Cornell Quarters
Maple Avenue
Dryden Road
Cascadilla Place
Highland Place
Williams Street
Oak Avenue
Cascadilla
Dewitt Place
Stewart
Lodge Street
College Avenue
Elmwood Avenue
One Ida Place
Judd Falls Road
Campus Road
Tower Road
Plantations